



United States
Department of
Agriculture

Natural Resources
Conservation
Service

In cooperation with
Montana Agricultural
Experiment Station

Soil Survey of Chouteau County Area, Montana Part I



How to Use This Soil Survey

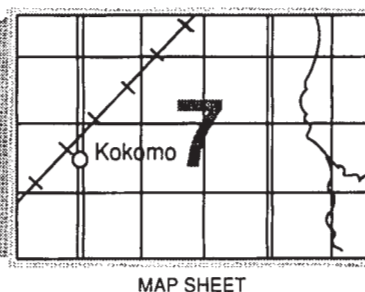
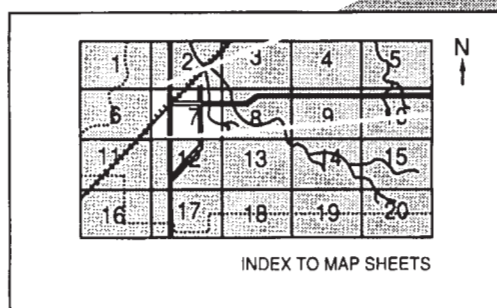
This survey is divided into three parts. Part I includes general information about the survey area; descriptions of the detailed soil map units and soil series in the area; and a description of how the soils formed. Part II describes the use and management of the soils and the major soil properties. This part may be updated as further information about soil management becomes available. Part III includes the maps.

Detailed Soil Maps

The detailed soil maps can be useful in planning the use and management of small areas.

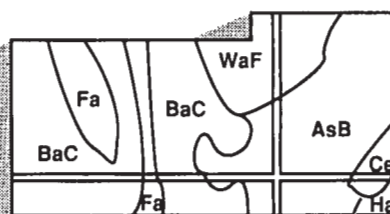
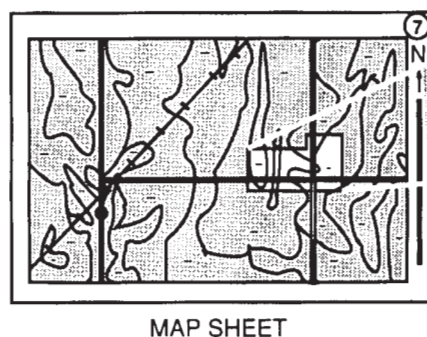
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet and turn to that sheet.

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** in Part I of this survey, which lists the map units by symbol and name and shows the page where each map unit is described.



The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

A **State Soil Geographic Data Base (STATSGO)** is available for this survey area. This



NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

data base consists of a soils map at a scale of 1:250,000 along with groups of associated soils. It replaces the general soils map published in older surveys. This map and its data base can be useful for planning multi-county areas and map output can be tailored for specific use. For more information about the State Soil Geographic Data Base for this survey area, or for any portion of Montana, contact your local Natural Resources Conservation Service office.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1991. Soil names and descriptions were approved in 1992. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1992. This survey was made cooperatively by the Natural Resources Conservation Service; United States Department of the Interior, Bureau of Indian Affairs; and the Montana Agricultural Experiment Station. It is part of the technical assistance furnished to the Chouteau County Conservation District, Big Sandy Conservation District, and the Chippewa-Cree Tribal Council.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

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**Cover: White Rocks area of the Missouri River. This area is designated as wild and scenic river.
(Photo by C.P. Heidlebaugh, Loma, Montana.)**

Additional information about the Nation's natural resources is available on the Natural Resources Conservation Service home page on the World Wide Web. The address is <http://www.nrcs.usda.gov> (click on "Technical Resources").

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Foreword

This soil survey contains information that can be used in land-planning programs in Chouteau County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. The location of each soil is shown on the detailed soil maps. Each soil in the county is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Shirley Gammon
State Conservationist
Natural Resources Conservation Service

Soil Survey of Chouteau County Area, Montana

Fieldwork by Rebecca L. Bronec, Michael F. Browne, Barry R. Cohn, Charles C. French, Mary A. Grande, Patricia O'Byrne Haven, Donna L. Hinz, Jan Larson, Richard M. Saunders, and Neal R. Svendsen, Natural Resources Conservation Service

United States Department of Agriculture, Natural Resources Conservation Service,
in cooperation with the United States Department of Interior, Bureau of Indian Affairs;
and the Montana Agricultural Experiment Station

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind or segment of the landscape. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landscape, soil scientists develop a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientists to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Individual soils on the landscape commonly merge into one another as their characteristics gradually

change. To construct an accurate map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted color, texture, size, and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and

the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

The descriptions, names, and delineations of the soils in this survey area do not fully agree with those of the soils in adjacent survey areas. Differences are the result of a better knowledge of soils, modifications in series concepts, or variations in the intensity of mapping or in the extent of the soils in the survey areas.

General Nature of the Survey Area

The Chouteau County Area soil survey is in the north-central part of Montana (fig. 1). It has a total area of about 2,526,082 acres, or 3,947 square miles. The Chouteau County Area has a wide variety of topography that is characterized by level to rolling till plains over much of the county. Three major rivers, the Missouri, Marias, and Teton, flow through the survey area. The Bearpaw Mountains are in the northeastern part and the Highwood Mountains are in the southern part.

About 52 percent of the county is used as cropland, 46 percent is rangeland, and 2 percent is woodland. The principal crops are dryland wheat and barley. The

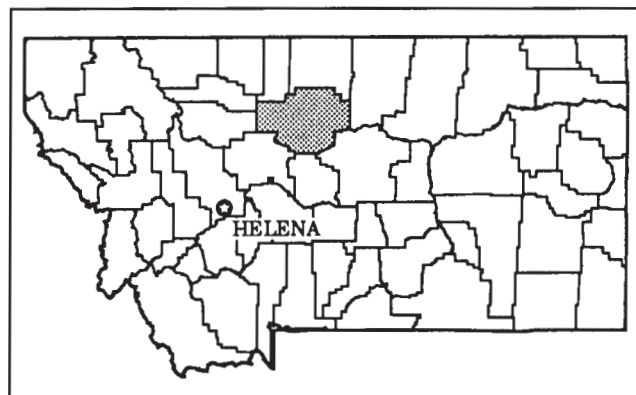


Figure 1. Location of Chouteau County in Montana.

main economic enterprises are growing small grains and raising beef cattle.

Descriptions, names, and delineations of soils in this soil survey do not fully agree with those on soil maps for adjacent counties. Differences are the result of better knowledge of soils, modifications in series concepts, intensity of mapping, or the extent of soils within the survey area.

This soil survey updates the "Soil Survey (Reconnaissance) of the Northern Plains of Montana," published in 1929. It provides additional information and has larger maps, which show the soils in greater detail.

History

The area that is now Chouteau County was largely inhabited by Indian tribes of the Blackfeet Nation when the Lewis and Clark expedition journeyed through the area in 1805. Conflicts with these tribes prevented the establishment of trading posts until an agreement was reached with the American Fur Company in 1830. Afterwards, forts to exchange animal pelts for goods were built along the Marias and Missouri Rivers, serving both white and Indian traders. Many of these forts were subsequently abandoned as hostilities with the Indians arose. Fort Benton was established in 1850 and named after Senator Thomas Benton.

In 1860, 55 years after Lewis and Clark explored the route of the Missouri River, the first steamboat reached Fort Benton from St. Louis, Missouri. The town, being on the longest river in North America, became the head of navigation and a major connection to the Northwest Territories. The chief items of trade were gold, buffalo hides, high grade ore, Indian blankets, guns, and whiskey. The gold stampede from 1867 to 1869, marked the height of the boom period for Fort Benton river trade, with thousands of miners coming in

and tons of gold dust and freight going out. September 29, 1887, marked the demise of the Missouri River traffic when the Manitoba Railway (later the Great Northern) drove its silver spike at Fort Benton.

As river trade faded, the livestock boom began and thousands of Texas long-horned cattle were brought to Chouteau County on the Chisholm Trail. Records show that in 1885, 100,000 cattle, 60,000 sheep, and 10,000 horses ranged south of the Marias River. The following year severe winter blizzards claimed 50 to 95 percent of the herds, which became prey of the open range. By the mid 1890s, Fort Benton arose as a major stock shipping point and also handled large volumes of wool.

Extensive settlement of the Chouteau County area began in the early 1900s, intensified by the Homestead Act of 1909. By 1913 most of the arable land was in private ownership. Steam powered engines were tilling the soil in the Carter area, and the days of the open range were over. Small grain farming prospered until the early 1920s, when bank collapse broke hundreds of homesteaders. This was due to inflated land values, unhealthy farming practices, and poor economic policies. Those who survived the crash improved their dryland farming techniques and continued to harvest high yields of small grains. By the mid 1920s, Chouteau County became the largest wheat producing county in Montana, and still consistently raises 10 percent of the state total. Both winter and spring wheat are grown as well as barley, oats, sunflower, safflower, alfalfa, and various certified seeds.

The Montana Territorial legislature established Chouteau County, named for Pierre Chouteau of the American Fur Company, on February 2, 1865. Fort Benton is the county seat. Other population centers are Loma, Big Sandy, Carter, Geraldine, and Highwood. The northern part of the county, in the Bearpaw Mountains, is home to the Chippewa-Cree tribe on the Rocky Boy Indian Reservation. Chouteau County also contains part of the Lewis and Clark National Forest, located in the Highwood Mountains to the south; and is the gateway to the 150 mile "Wild and Scenic" portion of the Missouri River.

Industry, Transportation, and Recreation

Growing crops and raising livestock, along with associated services, are the main industries in Chouteau County. Dryland farming is predominate throughout most of the survey area with limited irrigated crops along the rivers and streams. Winter wheat is the principal crop but spring wheat, barley, oats, oilseed crops, and alfalfa are also grown. Beef cattle production is important in the foothills of the

Bearpaw and Highwood Mountains, and also in the eastern part of the county. Occasionally, timber is harvested on a small scale in the Bearpaw and Highwood Mountains.

Nearly all the small grain produced is marketed through local elevators and shipped by rail or truck to west coast markets. Fort Benton, Big Sandy, Loma, Carter, and Geraldine have facilities for handling grain. The Burlington Northern Railroad and Montana Raillink serve Chouteau County with freight service. Federal highway 89 follows through the county from southwest of Carter through Big Sandy in the northeast. State highway 80 travels from Fort Benton, southeast through Geraldine and beyond. Secondary state highways provide paved vehicle traffic from northwest of Fort Benton, to west and southeast of Big Sandy. The county has numerous all weather, graveled county roads.

Recreational opportunities in the Chouteau County area are highlighted by the Missouri River. Designated as "Wild and Scenic" below Fort Benton, the Missouri flows through spectacular white sandstone cliffs of the Virgelle Sandstone formation. Many other scenic, natural, and historic sites occur along the Missouri River including Hole in the Wall, Citadel Rock, buffalo jumps, and various fort and camp sites. Hundreds of visitors float the Missouri River every year. Trout fishing is available in the county's rivers, streams, and private ponds. Warm water species are fished in the Marias and Missouri Rivers. Deer hunting, along with antelope and upland game birds, is done throughout the county on both private and public lands. Elk are hunted in the Bearpaw and Highwood Mountains, and mountain goats hunted on Square Butte. Fort Benton also has a top rated nine-hole golf course.

Physiography, Drainage, Ground Water Resources, Oil and Gas, and Economic Deposits

The Chouteau County Area lies within the Great Plains physiographic province in north-central Montana, near the southern margin of the glaciated Missouri Plains. The area consists predominantly of gently rolling plains that are dissected in the central portion by the Missouri River. Included within the area are portions of two small, isolated mountain ranges: the Bearpaw Mountains in the northeast corner of the county, and the Highwood Mountains which extend into the southern portion.

Surface elevations in the survey area range from approximately 2,450 feet to over 7,500 feet above sea level. The glaciated uplands have an average elevation

of 2,700 to 3,600 feet, with relatively low relief. The Bearpaw Mountains to the northeast rise to a maximum elevation of 6,250 feet at Pecora Ridge. The Highwood Mountains to the south rise to a maximum elevation of 7,625 feet at Highwood Baldy, and include the isolated buttes of Square Butte and Round Butte at elevations of 5,684 and 5,350 feet respectively.

The Missouri River flows generally eastward through the central portion of the survey area, controlling drainage within the area. The Teton River and the Marias River join the Missouri in central Chouteau County, between Fort Benton and Loma. The other major tributaries to the Missouri River are, listed from west to east, Belt Creek, Highwood Creek, Huntley Coulee, Shonkin Creek, Crow Coulee, Little Sandy Creek, Eagle Creek, Flat Creek, Chip Creek, and Birch Creek. Smaller intermittent streams drain the intermediate areas.

Ground water in the Chouteau County area is obtained from three different aquifers: sandstone bedrock, glacial outwash deposits, and river alluvium. The most important bedrock aquifers are the Kootenai, Eagle, and Judith River Formations, and significant volumes are also recovered from unconsolidated deposits. In addition, groundwater can be developed at springs which are numerous along the surface traces of faults and volcanic/sedimentary contacts. Springs and unconsolidated aquifers of glacial and alluvial gravels commonly produce the best quality water, however wells in shallow aquifers are subject to contamination.

The ground water development potential for each formation exposed in Chouteau County will be discussed below, from oldest to youngest.

The Kootenai Formation is used extensively as an artesian aquifer in the southwestern portion of the county. Its thicker sandstone beds yield moderate to large quantities of artesian water. It underlies up to 1,800 feet of the Colorado Group, and its water is highly mineralized with sodium sulfate.

The Colorado Group and the overlying Telegraph Creek Formation are relatively impermeable and highly mineralized with substantial concentrations of sulfates and selenium. They do not yield useable water to wells in the area. Surface water is highly mineralized as well, and has contributed to the major saline seep problem near Geraldine and on the Highwood Bench in the southern part of the survey area. This near-surface ground water can also contain high concentrations of trace metals and nitrates.

Within the Montana Group, only the Eagle and the Judith River Formations contain useable quantities of fresh water. Any water contained within the nearly

impermeable marine shale formations is too mineralized for use. The Judith River usually yields 5 to 15 gallons per minute (gpm) of soft, sodium bicarbonate water. The upper Eagle Formation usually yields small (2 to 5 gpm) amounts of water, however the lower Virgelle Sandstone Member yields 8 to 20 gpm. The water becomes more mineralized to the northeast, and eventually produces natural gas as well.

The Hell Creek and Fox Hills Formations are present in localized areas near the mountains, and while their total volume is small they will usually yield 3 to 20 gpm of mineralized water. Small volumes of relatively mineralized water can sometimes be developed from the overlying Fort Union Formation.

The igneous rocks exposed in the Bearpaw and Highwood Mountains are dense and impermeable. Small amounts of good quality water can sometimes be developed from interflow surfaces and fractured zones.

The five producing gas fields in the Chouteau County area are Buffalo Flats, Camp Creek, Hardpan, Little Creek Area, and Sherard. The Buffalo Flats also produce crude oil. These fields are producing from oil and gas trapped by the Bearpaw Uplift in the Judith River, Eagle/Virgelle, and Bow Island Formations. While Chouteau County is not a significant oil and gas producing county, the largest gas field in Montana, the Tiger Ridge field, lies to the northeast in Hill and Blaine Counties.

Known economic deposits of the Chouteau County area are limited to minor amounts of coal, bentonite, sand, and gravel. Small amounts of lignite have been locally mined from the top of the Judith River, Eagle, and Fort Union Formations. The coal beds range from a few inches to 2.5 feet in thickness, and their potential for development is limited by their size and variable areal extent. There are no strippable coal fields in the county.

Glaciofluvial and terrace alluvium gravel deposits are mined for sand and gravel.

Geology

The oldest rocks exposed in the Chouteau County area are sedimentary formations which were deposited during the Lower Cretaceous Period, beginning approximately 135 million years ago. They were deposited on coastal plains and the floor of a shallow sea as its shoreline moved back and forth across what is now central Montana. These rocks consist of a very thick sequence of shales and sandstones, which were later disrupted by igneous

activity during the Tertiary Period, beginning approximately 65 million years ago. Since the end of the volcanic period, only minor deformation has occurred and the sedimentary rocks are generally undisturbed, except near the igneous intrusions which make up the mountains. Today, the sedimentary rocks are relatively flat-lying, dipping from 1/2 to 3 degrees to the northeast.

The Highwood and Bearpaw Mountains are similar geologically and were formed in the mid-Eocene Epoch, a time of intense volcanic activity and mountain building which began approximately 50 million years ago. The geology of both mountain ranges has been studied extensively since the 1890s when W.H. Weed and L.V. Pirsson began publishing geologic maps and papers about the area.

These mountains are made up of a thick pile of igneous rocks. They are composed of a wide variety of intrusive and extrusive rock types, including some rare potassium and sodium-rich rocks. Included in these rock types is shonkinite, a dark, potassium-rich intrusive rock. This name was originated in an 1895 paper by Weed and Pirsson, who derived it from the small town of Shonkin, the Indian name for the Highwood Mountains. The volcanic rocks are made up of flows with interbedded lenses of ash, breccia, and volcanic sediments. The intrusions occur primarily as dikes and laccoliths, a relatively rare structure. Laccoliths are sill-like intrusive bodies that form when feeder dikes inject molten material between layers of sedimentary rocks. They typically have flat floors and domed roofs, unlike more common types of intrusive bodies.

The Highwood Mountains consist primarily of the eroded remnants of extrusive flows, with a dozen or more shonkinite laccoliths. The central core of the mountains is surrounded by a large dike swarm which radiates away from its center. The rock types consist of mafic (dark colored rocks high in iron and magnesium) and felsic (light colored rocks high in aluminum and shonkinite). The larger shonkinite laccoliths, including the nearby Square and Round Buttes, are capped by light-colored syenite, a silica-deficient, potassium rich rock.

The Bearpaw Mountains consist of two separate, deeply eroded volcanic fields. They are separated by the Bearpaw Arch, a northeast to east-trending band of deformed and metamorphosed sedimentary rocks that is 2 to 8 miles wide. The Bearpaw Mountains consist of the same rock types as are in the Highwood Mountains.

Continental ice sheets covered most of the area several different times since the beginning of the

Pleistocene Epoch, two to three million years ago, and left a thick blanket of glacial till covering the plains. The ice moved in a generally southwestward direction. Glacial till and outwash deposits cover most of the survey area, and glacial erratics occur at elevations above 5,000 feet in the Bearpaw Mountains. The ice sheet does not appear to have extended much beyond the Big Sag and the town of Highwood, or up into the Highwood Mountains.

Geologic Units

The sequence of rocks exposed in the survey area begins with the sedimentary rocks deposited during the Lower Cretaceous Period of the Mesozoic Era. These formations are summarized below, and all are listed in order of decreasing age. Because the rocks are dipping gently to the northeast, formations of decreasing age are exposed in northwest-southeast trending bands.

The classification of rock units based on their lithology is from largest to smallest, group, formation, and member. For example, a formation is subdivided into members. "Systems" are the rocks deposited during a particular geologic period.

Cretaceous system (135 to 65 million years). The Kootenai Formation contains the oldest rocks exposed in the Chouteau County area. They consist of red, green, and gray shale with cross-bedded sandstone and thin limestone beds. They are exposed only in a limited area in the Belt Creek drainage along the southwestern margin of the county. It is used extensively as an artesian aquifer in the southwestern half of the county. The Kootenai Formation is of such small extent that it is not associated with any particular soil series.

The Colorado Group directly overlies the Kootenai Formation, and is approximately 1,800 feet thick in this area. It crops out in a wide band north and northwest of the Highwoods, occupying over 30 percent of the county. It has locally been subdivided into the Blackleaf Formation and the overlying Marias River Formation, but is often referred to as the Colorado Shale. It consists of a dark gray marine shale with minor amounts of sandstone, and contains veins of selenite and bentonite layers. The bentonite is derived from weathered layers of volcanic ash. Due to the high salt content of the shale it is often associated with saline seeps and slick spots. Typical soils derived from this formation include Neldore, Bascovy, Marvan, Vanda, Norbert, and Barkof. These same series are formed on all shale bedrock in the survey area.

The Montana Group directly overlies the Colorado Group. It has been subdivided from bottom to top into the Telegraph Creek, Eagle Sandstone, Claggett Shale,

Judith River, Bearpaw Shale, and Fox Hills Formations. Its total thickness ranges from 1,965 to 2,300 feet.

The Telegraph Creek Formation is non-marine and consists primarily of thin, alternating beds of buff-colored sandstone and gray-blue shale. It is transitional between the underlying Colorado Group and the overlying Eagle Sandstone, and is locally thin or absent. It outcrops in small local exposures west of the town of Virgelle. The Telegraph Creek Formation is of such small extent that it is not associated with any particular soil series.

The Eagle Formation consists of an upper member with alternating beds of sandstone and shale, with minor amounts of coal. The lower, Virgelle Sandstone Member, is a massive buff to white sandstone which is very distinctive in outcrop. It forms the white bluffs above Highway 80, southeast of Geraldine, and the White Cliffs area on the Missouri River. The Virgelle Sandstone is used extensively as a regional aquifer, however the water can be highly mineralized. Typical soils derived from this formation include Fleak, Twilight, Busby, Cohagen, Tally, Vebar, Cabba, Macar, Sagedale, and Wayden.

The Claggett Shale underlies a large portion of the northern part of the survey area, and consists primarily of a brownish-gray marine shale. The surface turns to gumbo when wet, and it contains beds of bentonite up to 2 feet thick. It erodes to badlands topography where exposed. Typical soils derived from this formation include Neldore, Bascovy, and Marvan.

The Judith River Formation is exposed in the northeast corner of the county at the foot of the Bearpaw Mountains. It consists of crossbedded sandstone and gray to buff shale with minor amounts of lignite. It weathers to spectacular badlands where exposed, which include sodic slick spots. Typical soils derived from this formation include Cabbart, Yawdim, Delpoint, Yamacall, Megonot, and Weingart.

Minor amounts of the Bearpaw Shale outcrop in the foothills of the Bearpaw Mountains. It consists of a dark gray marine shale with bentonite beds. It is also associated with saline seeps. Its surface can glisten with gypsum crystals which have weathered out of the matrix, and it is known to contain fossils of marine reptiles. Typical soils derived from this formation include Neldore, Bascovy, Marvan, and Vanda.

The upper member of the Montana Group, the Fox Hills Sandstone, is the transitional unit between the Bearpaw Shale and the Hell Creek Formation. It consists of crossbedded sandstone at the bottom, and grades upward into interbedded sandstone and shale. The lower sandstone unit is used extensively as an

aquifer in many parts of Montana, but is limited in volume in the Chouteau County area. Typical soils derived from this formation include Fleak, Twilight, and Busby.

The Hell Creek Formation is the last formation to have been deposited during the Cretaceous Period. It is composed of alternating beds of shale and sandstone. It contains dinosaur bones, mostly in fragments, and is exposed in small outcrops east of Big Sandy in the foothills of the Bearpaw Mountains. Typical soils derived from this formation include Fleak, Twilight, and Busby.

Tertiary system (65 to 2.5 million years). The Fort Union Formation is the oldest formation in the Tertiary Period of the Cenozoic Era. It is a non-marine formation composed of sandstone and shale which once covered most of eastern Montana in thicknesses of several thousand feet. It has limited exposure in the survey area, outcropping in a few areas at the base of the Bearpaw Mountains. The Bearpaw Mountain volcanics were deposited unconformably upon the erosional surface of the Fort Union and the overlying Wasatch Formations. Typical soils derived from this formation include Cabbart, Delpoint, Yamacall, Yawdim, and Megonot.

The Wasatch Formation is the youngest consolidated sedimentary bedrock in the county, conformably overlying the Fort Union Formation. It consists of non-marine variegated siltstone, sandstone, and bentonitic mudstones. It has limited exposure in the Bearpaw Mountains, outcropping only within the Rocky Boy Reservation. The Wasatch Formation is of such small extent that it is not associated with any particular soil series.

The coarse grained intrusive rocks exposed in the mountains of the Chouteau County area were emplaced during the early Tertiary Period, approximately 50 million years ago. They include a variety of relatively unusual silica deficient rocks including shonkinite, syenite, monzonite, and latite, and occur primarily as dikes and laccoliths. Typical soils derived from these rock types include Ambrant, Elkner, Hedoes, Belain, and Whitlash.

The fine grained extrusive rocks have similar composition to the coarse grained rocks, high in potassium and sodium and low in silica, however they erupted at the surface and are finer textured. Common rock types are trachyte, leucite, phonolite, and latite. Typical soils derived from these rock types include Winkler, Garlet, Perma, and Whitlash.

Unconsolidated Quaternary-aged terrace deposits, formed by streams and slope wash, occur up to 200 feet above present valley levels. They consist of poorly

sorted, limy, bouldery gravels and can be more than 20 feet thick. Typical soils derived from these deposits include Attewan, Tinsley, Turner, Sweetgrass, Tamaneen, and Beaverton.

The present valleys are filled with Quaternary-aged alluvium. They consist of gravel, sand, silt, and clay in maximum thicknesses of 25 feet, in smaller drainages and undrained depressions. The Missouri River alluvium is much thicker, with a maximum thickness of 150 feet, and consist of stratified clay, silt, and sand with a few lenses of gravel. Typical soils formed from these deposits include Bigsandy, Havre, Glendive, Rivra, Straw, Nesda, and McIlwaine.

Glacial till, glaciofluvial deposits, and glaciolacustrine deposits cover the surface of much of the survey area. The till consists of unstratified, highly consolidated, gray clay with inclusions of sand, gravel, and boulders up to 12 feet in diameter. It is made up of finely ground sedimentary rocks which were scraped up and incorporated in the ice as the glacier advanced, and includes erratics from as far away as the Canadian Shield in northeastern Canada. Till averages 5 to 30 feet in thickness, with a maximum thickness of 300 feet. There is commonly a 3 to 15 foot thick gravel zone between the till and the underlying bedrock. Typical soils derived from glacial till include Telstad, Joplin, Scobey, Kevin, Hillon, Bearpaw, Vida, and Zahill. The glaciofluvial deposits consist of mixtures of materials moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. These deposits are often intricately associated with the glacial till. Typical soils derived from glaciofluvial deposits are Chinook, Degrand, Ethridge, Evanston, Farnuf, Fortbenton, Kremlin, Lonna, and Savage. The glaciolacustrine deposits are silts and clays derived from glaciers and deposited in glacial lakes by water originating mainly from the melting of glacial ice. Many deposits are bedded or laminated with varves. Extensive areas of glaciolacustrine deposits are in the southwestern part of the survey area from Glacial Lake Great Falls. Typical soils are Acel, Kobase, Lambeth, Linnet, Lonna, Marias, and Pendroy.

Special Geologic Features

Glacial activity in the survey area has created several unusual erosional features and some spectacular scenery. Temporary meltwater channels from Glacial Lake Great Falls have eroded large valleys including the Big Sag, northeast of Highwood, and the Shonkin Sag. Shonkin Sag, on the north side of the Highwood Mountains, was eroded by water from Glacial Lake Great Falls while the ice front stood near the base of the Highwoods.

A cross section of the Shonkin laccolith is visible above the Shonkin Sag, and the interfingering igneous and sedimentary rocks are clearly exposed (fig. 2).

The Lost Lake laccolith was exposed by erosion of a retreating waterfall of glacial meltwater. Lost Lake now sits below vertical cliffs of shonkinite 100 feet high, and its interfingering sediments and shonkinite are also very well exposed. The shonkinite outcropping at the surface above Lost Lake has weathered along the horizontal joint system to form hoodoos, which are sculpted erosional remnants resembling well rounded columns.

More spectacular geology is exposed in the Missouri River channel below Virgelle. At the White Cliffs Area, near Eagle Creek, the river has eroded through the white Virgelle Sandstone leaving 180 foot high cliffs. The surface of the Virgelle has also eroded to form hoodoos, and more resistant iron concretions within the formation can be seen sticking out of the face.

Climate

The Chouteau County Area generally has pleasant summers with cool nights, warm and sunny days, and little weather that is very hot or humid. Most summer rainfall occurs as showers and thunderstorms, but steady rains may occur during late spring and early summer. Early spring and fall have periods of strong winds that last for several days at a time. Only 2 years in 10 will have temperatures exceeding 100 degrees F. in July or August. Most precipitation falls during the warm period from April to September and is heaviest in May to August.

Winters are not as cold as usually expected of continental locations at this latitude, largely as result of the "chinook" winds for which the area is noted. While sub-zero weather is experienced several times during the winter, the coldest temperatures seldom last more than a week or two at a time. Frequent southwest "chinook" winds can produce sharp temperature rises of 40 degrees F. or more in a few hours. As a result of recurring "chinooks," snow seldom accumulates to any great depth. The ground is usually bare or nearly bare most of the winter except in the mountains and foothills. Invasions of cold arctic air from the north occur several times each winter, with sharp temperature drops and heavy snowfall.

The Temperature and Precipitation table gives data on temperature and precipitation in the survey area as recorded at Big Sandy, Fort Benton, Geraldine, Iliad, Loma, and Shonkin. The Freeze Dates in Spring and Fall table shows probable dates of the first freeze in fall



Figure 2. Nearly vertical cliffs of shonkinite rock at Lost Lake.

and the last freeze in spring. The Growing Season table provides data on length of the growing season.

As is usual in areas having large variations in elevation and irregular topographic features, differences in the amount and time of precipitation are considerable. Generally, precipitation falls as snow during late fall, winter, and early spring. Late spring, summer, and early fall precipitation is almost always rain, but hail occurs frequently during summer thunderstorms. The wettest areas are in the foothills and mountains.

Although the plains areas' average annual precipitation would normally classify as semi-arid, it is

important to note that about 70 percent of the annual total precipitation falls during the April to September growing season. The combination of ideal temperatures during the peak of the growing season, long hours of summer sunshine, and nearly 10 inches of precipitation during the 6 critical months makes the climate very favorable for dryland farming. Heavy fog seldom occurs, incidence usually being limited to about one day per month, but each case lasts only a small part of the day. Although the average windspeed is relatively high, extremely strong winds of over 50 mph seldom are observed and visibility normally is excellent.

Temperature and Precipitation

(Recorded in the period 1961-90 at Big Sandy; Fort Benton; Geraldine; Iliad; Loma; and Shonkin)

Month	Temperature (Degrees F.)						Precipitation (Inches)				
				2 years in 10		Average number of growing degree days*	2 years in 10			Average number of days with 0.10 or more	Average total snow fall
	Average daily maximum	Average daily minimum	Average	max. temp more than	min. temp less than		Average	Less than	More than		
BIG SANDY:											
January----	27.9	4.6	16.3	57	-35	7	0.63	0.29	0.97	2	7.2
February--	36.1	11.4	23.7	63	-25	13	0.40	0.17	0.60	1	3.0
March-----	46.0	20.7	33.3	72	-16	57	0.55	0.19	0.85	2	3.7
April-----	59.8	31.1	45.5	85	7	213	1.06	0.37	1.70	2	1.7
May-----	70.6	41.1	55.8	92	25	492	2.65	1.06	4.00	5	0.2
June-----	79.7	49.1	64.4	98	34	730	2.39	1.22	3.41	5	0.0
July-----	87.8	53.1	70.4	101	39	939	1.49	0.53	2.28	3	0.0
August-----	86.8	51.5	69.1	104	36	893	1.44	0.48	2.32	3	0.0
September--	73.9	41.0	57.5	96	23	526	1.53	0.53	2.35	3	0.1
October----	62.9	31.6	47.3	86	6	269	0.75	0.30	1.13	2	0.9
November---	43.5	18.4	31.0	70	-17	41	0.49	0.16	0.78	1	3.8
December---	31.5	7.9	19.7	60	-33	7	0.48	0.20	0.75	1	2.6
Yearly:											
Average---	58.9	30.1	44.5	---	---	---	---	---	---	---	---
Extreme---	111	-51	---	105	-39	---	---	---	---	---	---
Total-----	---	---	---	---	---	4,188	13.86	9.30	16.84	30	23.1
FT. BENTON:											
January----	32.3	8.6	20.5	64	-32	22	0.71	0.24	1.13	2	15.3
February--	39.9	14.3	27.1	69	-23	30	0.46	0.20	0.69	1	9.5
March-----	48.2	21.6	34.9	75	-15	68	0.91	0.40	1.34	2	9.7
April-----	60.3	31.2	45.8	86	9	214	1.21	0.42	1.86	3	5.5
May-----	69.9	40.8	55.4	92	24	478	2.51	1.31	3.57	5	0.5
June-----	78.7	48.5	63.6	98	34	707	2.51	1.09	3.73	5	0.0
July-----	86.1	52.3	69.2	101	39	906	1.29	0.42	2.01	3	0.0
August-----	84.7	50.9	67.8	102	35	861	1.45	0.33	2.32	3	0.0
September--	73.1	40.7	56.9	95	23	510	1.29	0.41	2.01	3	0.3
October----	63.3	32.0	47.6	87	8	269	0.80	0.25	1.24	2	1.7
November---	46.2	20.2	33.2	74	-14	62	0.58	0.19	0.90	2	8.5
December---	34.6	11.1	22.9	65	-32	24	0.67	0.27	1.01	2	13.5
Yearly:											
Average---	59.8	31.0	45.4	---	---	---	---	---	---	---	---
Extreme---	109	-49	---	103	-37	---	---	---	---	---	---
Total-----	---	---	---	---	---	4,150	14.39	11.39	17.23	33	64.4
GERALDINE:											
January----	33.1	9.1	21.1	64	-29	27	0.80	0.38	1.21	2	12.9
February--	39.6	15.0	27.3	67	-21	31	0.49	0.22	0.72	2	7.3
March-----	46.2	21.6	33.9	73	-16	63	0.80	0.32	1.20	2	9.2
April-----	57.8	30.5	44.2	83	7	179	1.17	0.61	1.67	3	6.6
May-----	67.6	40.1	53.8	89	22	430	3.17	1.70	4.47	6	1.7
June-----	76.7	47.9	62.3	97	33	666	2.52	1.35	3.56	5	0.1
July-----	85.3	51.9	68.6	100	38	886	1.54	0.68	2.28	3	0.0
August-----	84.4	50.7	67.6	102	35	855	1.61	0.48	2.53	3	0.0
September--	72.3	41.2	56.8	95	22	507	1.41	0.47	2.18	3	0.6

* See footnote at end of table.

Temperature and Precipitation--Continued

(Recorded in the period 1961-90 at Big Sandy; Fort Benton; Geraldine; Iliad; Loma; and Shonkin)

	Temperature (Degrees F.)						Precipitation (Inches)					
Month	Average	Average		2 years in 10		Average		2 years in 10		Average		
	daily	daily	Average	will have	will have	number		will have	number	Average		
	maximum	minimum		max. temp more than	min. temp less than	of growing degree days*		Less than	More than	of days with 0.10 or more	total snow fall	
GERALDINE (cont.)												
October---	62.1	32.9	47.5	85	7	270	0.85	0.26	1.33	2	2.6	
November--	45.5	20.7	33.1	73	-14	62	0.58	0.20	0.90	2	7.5	
December--	35.4	11.5	23.4	65	-31	25	0.71	0.25	1.08	2	11.7	
Yearly:												
Average--	58.8	31.1	45.0	---	---	---	---	---	---	---	---	
Extreme--	108	-42	---	103	-34	---	---	---	---	---	---	
Total----	---	---	---	---	---	4,001	15.65	12.75	17.91	35	60.2	
ILIAD:												
January---	29.5	5.8	17.6	61	-34	9	0.50	0.24	0.94	2	5.1	
February--	36.4	12.3	24.4	65	-23	13	0.40	0.24	0.63	1	3.6	
March-----	46.2	20.8	33.5	72	-15	47	0.59	0.25	0.88	1	1.7	
April-----	59.7	30.7	45.2	85	9	192	0.99	0.48	1.49	3	1.6	
May-----	69.4	39.9	54.6	92	25	443	2.38	1.20	3.42	5	0.4	
June-----	78.5	47.5	63.0	98	32	648	2.10	1.23	2.87	5	0.0	
July-----	87.0	51.8	69.4	102	38	853	1.33	0.68	1.98	3	0.0	
August-----	85.6	49.9	67.7	103	35	838	1.50	0.53	2.50	3	0.0	
September--	73.3	39.5	56.4	97	21	479	1.12	0.39	1.86	3	0.0	
October---	62.4	30.4	46.4	87	6	234	0.66	0.23	1.05	2	0.5	
November--	44.0	17.8	30.9	72	-17	39	0.40	0.22	0.70	1	1.0	
December--	31.2	7.2	19.2	62	-34	8	0.34	0.19	0.65	1	1.8	
Yearly:												
Average--	58.6	29.5	44.0	---	---	---	---	---	---	---	---	
Extreme--	112	-48	---	104	-38	---	---	---	---	---	---	
Total----	---	---	---	---	---	3,802	12.29	8.37	14.03	30	15.6	
LOMA:												
January---	30.7	4.4	17.6	63	-39	12	0.72	0.29	1.12	2	12.9	
February--	38.9	11.2	25.1	68	-27	20	0.45	0.16	0.69	1	8.1	
March-----	47.8	20.5	34.1	75	-18	58	0.82	0.31	1.24	2	7.0	
April-----	60.4	30.5	45.4	87	7	206	1.07	0.43	1.74	3	4.3	
May-----	70.9	40.4	55.7	95	24	482	2.32	1.19	3.30	5	0.8	
June-----	80.1	48.7	64.4	101	34	723	2.32	1.14	3.35	5	0.0	
July-----	88.6	52.9	70.8	104	40	945	1.22	0.52	1.81	3	0.0	
August-----	86.8	50.7	68.8	105	36	884	1.47	0.55	2.42	3	0.0	
September--	74.6	40.8	57.7	99	24	533	1.20	0.32	1.90	3	0.5	
October---	63.7	30.9	47.3	88	7	261	0.70	0.27	1.06	2	1.2	
November--	46.1	18.3	32.2	74	-17	52	0.53	0.20	0.83	2	6.7	
December--	33.9	7.4	20.6	64	-39	15	0.60	0.22	0.92	2	10.7	
Yearly:												
Average--	60.2	29.7	45.0	---	---	---	---	---	---	---	---	
Extreme--	111	-54	---	107	-45	---	---	---	---	---	---	
Total----	---	---	---	---	---	4,190	13.40	10.20	16.11	33	52.3	

* See footnote at end of table.

Temperature and Precipitation--Continued

(Recorded in the period 1961-90 at Big Sandy; Fort Benton; Geraldine; Iliad; Loma; and Shonkin)

Month	Temperature (Degrees F.)						Precipitation (Inches)				
	Average			2 years in 10			2 years in 10			Average	
	will have			will have			will have			will have	
	daily	daily	Average	max.	min.	of	Average	Less	More	of days	total
	maximum	minimum		temp	temp	growing		than	than	with	snow
				more	less	degree				0.10 or	fall
				than	than	days*				more	
SHONKIN:											
January---	33.2	11.9	22.6	60	-27	22	1.50	0.68	2.21	5	23.0
February--	38.5	17.3	27.9	62	-19	24	1.12	0.67	1.52	3	14.9
March-----	43.4	22.1	32.8	69	-13	47	2.06	1.10	2.90	5	23.7
April-----	52.7	30.1	41.4	78	6	136	2.70	1.40	3.83	6	18.4
May-----	62.3	38.4	50.4	85	21	330	5.35	2.77	7.61	7	7.0
June-----	71.1	45.0	58.0	90	31	537	4.33	1.95	6.37	7	0.0
July-----	79.8	49.4	64.6	95	37	748	1.91	0.76	2.89	4	0.0
August-----	79.5	48.3	63.9	96	35	726	2.21	0.72	3.43	3	0.0
September--	67.2	40.6	53.9	91	21	424	2.93	1.18	4.59	5	2.3
October---	58.0	34.1	46.0	81	8	237	1.85	0.92	2.77	4	8.8
November--	43.0	22.8	32.9	68	-12	57	1.30	0.57	1.91	4	15.0
December--	35.5	15.7	25.6	60	-28	26	1.49	0.72	2.15	4	22.3
Yearly:											
Average--	55.3	31.3	43.3	---	---	---	---	---	---	---	---
Extreme--	104	-42	---	98	-32	---	---	---	---	---	---
Total----	---	---	---	---	---	3,313	28.75	22.41	34.38	57	135.5

*A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area. (Threshold: 40.0 deg. F)

Freeze Dates in Spring and Fall

(Recorded in the period 1961-90 at Big Sandy; Fort Benton; Geraldine; Iliad; Loma; and Shonkin)

Probability	Temperature		
	24 degrees F or lower	28 degrees F or lower	32 degrees F or lower
BIG SANDY:			
Last freezing temperature in spring: January-July			
1 year in 10 later than----	May 5	May 23	June 6
2 years in 10 later than---	May 1	May 17	May 31
5 years in 10 later than---	April 22	May 6	May 20
First freezing temperature in fall: August-Dec.			
1 year in 10 earlier than--	Sept. 19	Sept. 10	Sept. 4
2 years in 10 earlier than-	Sept. 25	Sept. 16	Sept. 8
5 years in 10 earlier than-	Oct. 6	Sept. 26	Sept. 16
FORT BENTON:			
Last freezing temperature in spring: January-July			
1 year in 10 later than----	May 5	May 20	June 3
2 years in 10 later than---	May 1	May 15	May 30
5 years in 10 later than---	April 22	May 5	May 21
First freezing temperature in fall: August-Dec.			
1 year in 10 earlier than--	Sept. 19	Sept. 6	Sept. 3
2 years in 10 earlier than-	Sept. 25	Sept. 12	Sept. 7
5 years in 10 earlier than-	Oct. 5	Sept. 24	Sept. 14
GERALDINE:			
Last freezing temperature in spring: January-July			
1 year in 10 later than----	May 13	May 22	June 11
2 years in 10 later than---	May 8	May 17	June 5
5 years in 10 later than---	April 27	May 8	May 24

Freeze Dates in Spring and Fall--Continued

(Recorded in the period 1961-90 at Big Sandy; Fort Benton; Geraldine; Iliad; Loma; and Shonkin)

Probability	Temperature		
	24 degrees F or lower	28 degrees F or lower	32 degrees F or lower
GERALDINE (cont.)			
First freezing temperature in fall: August-Dec.			
1 year in 10 earlier than--	Sept. 14	Sept. 5	Sept. 3
2 years in 10 earlier than-	Sept. 20	Sept. 11	Sept. 8
5 years in 10 earlier than-	Oct. 2	Sept. 23	Sept. 16
ILIAD:			
Last freezing temperature in spring: January-July			
1 year in 10 later than----	May 14	May 27	June 8
2 years in 10 later than---	May 7	May 20	May 31
5 years in 10 later than---	April 24	May 6	May 17
First freezing temperature in fall: August-Dec.			
1 year in 10 earlier than--	Sept. 14	Sept. 7	Sept. 2
2 years in 10 earlier than-	Sept. 20	Sept. 12	Sept. 6
5 years in 10 earlier than-	Oct. 2	Sept. 22	Sept. 16
LOMA:			
Last freezing temperature in spring: January-July			
1 year in 10 later than----	May 5	May 19	June 1
2 years in 10 later than---	May 1	May 14	May 27
5 years in 10 later than---	April 22	May 5	May 17
First freezing temperature in fall: August-Dec.			
1 year in 10 earlier than--	Sept. 19	Sept. 13	Sept. 2
2 years in 10 earlier than-	Sept. 25	Sept. 18	Sept. 6
5 years in 10 earlier than-	Oct. 5	Sept. 27	Sept. 14

Freeze Dates in Spring and Fall--Continued

(Recorded in the period 1961-90 at Big Sandy; Fort Benton; Geraldine; Iliad; Loma; and Shonkin)

Probability	Temperature		
	24 degrees F or lower	28 degrees F or lower	32 degrees F or lower
SHONKIN:			
Last freezing temperature in spring: January-July			
1 year in 10 later than----	May 12	May 26	June 20
2 years in 10 later than---	May 5	May 20	June 13
5 years in 10 later than---	April 23	May 9	May 29
First freezing temperature in fall: August-Dec.			
1 year in 10 earlier than--	Sept. 17	Sept. 11	Sept. 2
2 years in 10 earlier than-	Sept. 24	Sept. 17	Sept. 7
5 years in 10 earlier than-	Oct. 7	Sept. 28	Sept. 17

Growing Season

(Recorded in the period 1961-90 at Big Sandy; Fort Benton; Geraldine; Iliad; Loma; and Shonkin)

Probability	Daily Minimum Temperature		
	Higher than 24 degrees F	Higher than 28 degrees F	Higher than 32 degrees F
	Days	Days	Days
BIG SANDY:			
9 years in 10-----	142	122	96
8 years in 10-----	150	129	104
5 years in 10-----	165	142	118
2 years in 10-----	181	155	133
1 year in 10-----	189	162	140
FORT BENTON:			
9 years in 10-----	145	117	96
8 years in 10-----	152	125	103
5 years in 10-----	164	141	116
2 years in 10-----	177	156	129
1 year in 10-----	183	164	135
GERALDINE:			
9 years in 10-----	137	116	90
8 years in 10-----	145	123	98
5 years in 10-----	159	137	114
2 years in 10-----	173	151	129
1 year in 10-----	180	159	137
ILIAD:			
9 years in 10-----	134	115	95
8 years in 10-----	143	124	104
5 years in 10-----	160	140	122
2 years in 10-----	177	157	140
1 year in 10-----	185	166	149

Growing Season--Continued

(Recorded in the period 1961-90 at Big Sandy; Fort Benton; Geraldine;
Iliad; Loma; and Shonkin)

Probability	Daily Minimum Temperature		
	Higher than	Higher than	Higher than
	24 degrees F	28 degrees F	32 degrees F
	Days	Days	Days
LOMA:			
9 years in 10-----	141	126	98
8 years in 10-----	149	132	105
5 years in 10-----	165	145	120
2 years in 10-----	181	157	134
1 year in 10-----	189	164	141
SHONKIN:			
9 years in 10-----	134	119	85
8 years in 10-----	145	127	94
5 years in 10-----	166	141	111
2 years in 10-----	187	155	128
1 year in 10-----	198	163	137

Formation and Classification of the Soils

Formation of the Soils

Soil is a natural, three dimensional body on the earth's surface. It has properties that result from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over a period of time.

Although there are many different soils, each soil is the result of the interaction of the same five factors. These factors are the physical and chemical composition of the parent material, the effect of climate on the parent material, the kinds of plants and organisms living in the soil, the relief of the land, and the length of time it took for the soil to form.

Within short distances the combination of these factors varies, and consequently the soils that form differ in fertility, productivity, and physical and chemical characteristics.

This section relates the soils in the survey area to the major factors of soil formation and describes the system of soil classification.

Climate

Climate, an active force in the formation of soils, is determined mainly by temperature and precipitation. In this survey area the winters are cold, springs are cool and moist, and summers are hot and dry. Artic cold waves, and gusty warm southwest winds called chinooks, are a part of the winter weather patterns. Erosion and alternate freezing and thawing break down rocks into material in which soils form. The weathered material is further broken down by chemical reactions such as solution and hydration.

Precipitation and temperature affect the kind and amount of vegetation that grows on the soil. Vegetation decays to produce organic matter in the soil. Soils that have cool temperatures and high precipitation generally contain more organic matter and are dark colored. Soils with warm temperatures and low precipitation generally contain less organic matter and are light colored.

The average annual precipitation ranges from about

11 to 17 inches on the till plains and sedimentary plains, and from 15 to 28 inches in the foothills and mountains. The average annual temperature ranges from 38 to 45 degrees F.

Living Organisms

Living organisms are active in the formation of soils. Plants, animals, insects, and micro-organisms affect gains or losses in organic matter, plant nutrients in the soil, and changes in porosity and structure.

Roots, rodents, and insects penetrate the soil and alter its structure. Leaves, roots, and entire plants that remain in the surface layer are changed to humus by micro-organisms, chemicals in the soil, and insects. Fungi and algae also contribute to the decomposition of bedrock. Animals and insects increase porosity by burrowing through the soil and leaving open channels for the movement of water and air. Common rodents in the area are ground squirrels, badgers, prairie dogs, and rabbits.

The vegetation in the survey area is mainly short grasses, mid grasses, and shrubs on the plains; with mid grasses, shrubs, coniferous, and deciduous trees in the foothills and mountains.

Topography

Topography, or relief, is determined by glaciation and the age and resistance of geologic formations to erosion by wind and water. It influences soil development through its effect on drainage and runoff. Runoff water and rivers have carved deep valleys on eroded uplands of the survey area. These rugged areas contrast sharply with the smoother areas of the till plains.

On uplands, the number and distinctness of soil horizons generally decrease as the slope increases. Soils on steep slopes with rapid runoff have many characteristics similar to those of soils formed in arid climates. Nearly level to moderately sloping soils have the characteristics of soils that are the most common

in this survey area. Examples of this general principle are the Hillon soils that are moderately steep to very steep and the Telstad soils that are nearly level to gently rolling.

Parent Material

Many of the soils in this survey formed in glacial till or in glaciofluvial deposits. Some of the soils formed in alluvium derived from mixed sources, and other soils formed in material weathered from shale, sandstone, or igneous rocks.

The soils that formed in glacial till, such as the Telstad and Joplin series, are loamy, while the Scobey and Bearpaw series are clayey. Soils that formed in sandstone or interbedded sandstone and shale, such as the Cabba and Reeder series, are loamy. Soils that formed in shale, such as the Neldore and Bascovy series, are clayey. The soils that formed in mixed alluvium, such as the Hanly, Havre, and Harlake series may be sandy, loamy, or clayey.

Many soils in the survey area have accumulated calcium carbonate or lime, sodium, and other salts from the parent material. The salts and sodium make these soils slightly to strongly saline and sodic, and limit the amount and kind of plant cover.

Time

The changes that take place in a soil over long periods of time are called soil genesis. Distinct layers, or horizons, develop in the soil as a result of these changes. The length of time that parent materials have been in place and exposed to climate and living organisms is generally reflected in the degree to which the soil profile has developed. The kinds and arrangement of horizons are called the soil morphology, and they are described in terms of color, texture, structure, consistence, thickness, permeability, and chemistry.

Soils are classified as young to mature. The age of a soil is determined from the thickness of the surface layer or A horizon, the content of clay and organic matter, the depth to which soluble material is leached, and the form and distribution of calcium carbonate and gypsum in the soil.

Young soils show very little profile development. The Havre series, a soil of the Entisol order, is an example of a young soil. It is on a flood plain adjacent to a flowing stream. The soil contains little organic matter with which to form an A horizon, it has little clay accumulation, and little translocation of carbonates within the profile.

The Evanston series, of the Mollisol order, formed in parent material that is similar to that of the Havre series but is much older. The Evanston soils formed in alluvium or glaciofluvial deposits on alluvial fans, stream terraces, and small drainageways. They contain enough organic matter to have a dark colored A horizon, have a distinct clay accumulation in the subsoil or Bt horizon, and nearly all of the carbonates have been leached to a depth of about 14 inches.

Many of the sloping, steep, and shallow soils appear to have been in the process of formation about as long as some of the more developed, less sloping soils. However, erosion has removed the soil as fast as it formed. In this case the effect of time has been offset by the effect of relief.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. The table "Classification of the Soils" in Parts I and II of the publication shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Alfisols.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *alf*, from Alfisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Albaqualfs (*Alb*, meaning white, plus *aqualf*, the suborder of the Alfisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typical subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the

great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Albaqualfs.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered

are particle-size class, mineral content, temperature regime, thickness of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine, montmorillonitic, frigid Typic Albaqualfs.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series. An example is the Nishon series, which is a fine, montmorillonitic, frigid Typic Albaqualfs.

Classification of the Soils

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics that are outside the range of the series)

Soil name	Family or higher taxonomic class
Absarokee-----	Fine, montmorillonitic Typic Argiborolls
Absher-----	Fine, montmorillonitic Typic Natriboralfs
Acel-----	Fine, montmorillonitic Mollic Eutroboralfs
Ambrant-----	Coarse-loamy, mixed, frigid Typic Ustochrepts
Amor-----	Fine-loamy, mixed Typic Haploborolls
Arrowpeak-----	Loamy-skeletal, mixed Lithic Cryoborolls
Assiniboine-----	Fine-loamy, mixed Aridic Argiborolls
Attewan-----	Fine-loamy over sandy or sandy-skeletal, mixed Aridic Argiborolls
Barkof-----	Fine, montmorillonitic, frigid Leptic Udic Haplusterts
Bascovy-----	Fine, montmorillonitic, frigid Leptic Udic Haplusterts
Bearpaw-----	Fine, montmorillonitic Typic Argiborolls
Beaverton-----	Loamy-skeletal over sandy or sandy-skeletal, mixed Typic Argiborolls
Belain-----	Coarse-loamy, mixed Typic Haploborolls
Benz-----	Fine-loamy, mixed (calcareous), frigid Aridic Ustorthents
Bigsag-----	Fine, montmorillonitic (calcareous), frigid Typic Halaquepts
Bigsandy-----	Fine-loamy, mixed (calcareous), frigid Typic Fluvaquents
Busby-----	Coarse-loamy, mixed, frigid Aridic Ustochrepts
Cabba-----	Loamy, mixed (calcareous), frigid, shallow Typic Ustorthents
Cabbart-----	Loamy, mixed (calcareous), frigid, shallow Aridic Ustorthents
Chinook-----	Coarse-loamy, mixed Aridic Haploborolls
Cohagen-----	Loamy, mixed (calcareous), frigid, shallow Typic Ustorthents
Cozberg-----	Coarse-loamy, mixed Aridic Haploborolls
Creed-----	Fine, montmorillonitic Typic Natriboralfs
Crow-----	Fine, mixed Glossic Eutroboralfs
Daglum-----	Fine, montmorillonitic Vertic Natriborolls
Degrad-----	Fine-loamy over sandy or sandy-skeletal, mixed Aridic Argiborolls
Delpoint-----	Fine-loamy, mixed, frigid Aridic Ustochrepts
Eaglecreek-----	Fine-loamy, mixed Mollic Eutroboralfs
Eagleton-----	Fine-loamy, mixed, frigid Cumulic Endoaquolls
Elkner-----	Coarse-loamy, mixed Typic Cryochrepts
Elloam-----	Fine, montmorillonitic Typic Natriboralfs
Elve-----	Loamy-skeletal, mixed Typic Cryochrepts
Enbar-----	Fine-loamy, mixed Cumulic Haploborolls
Ethridge-----	Fine, montmorillonitic Aridic Argiborolls
Evanston-----	Fine-loamy, mixed Aridic Argiborolls
Farnuf-----	Fine-loamy, mixed Typic Argiborolls
Ferd-----	Fine, montmorillonitic Glossic Eutroboralfs
Flatcreek-----	Fine, montmorillonitic (calcareous), frigid Vertic Ustifluvents
Fleak-----	Mixed, frigid, shallow Aridic Ustipsamments
Fortbenton-----	Fine-loamy, mixed Aridic Haploborolls
Garlet-----	Loamy-skeletal, mixed Typic Cryochrepts
Gerber-----	Fine, montmorillonitic Vertic Argiborolls
Gerdrum-----	Fine, montmorillonitic Typic Natriboralfs
Glendive-----	Coarse-loamy, mixed (calcareous), frigid Aridic Ustifluvents
Hanly-----	Sandy, mixed, frigid Aridic Ustifluvents
Harlake-----	Fine, montmorillonitic (calcareous), frigid Aridic Ustifluvents
Havre-----	Fine-loamy, mixed (calcareous), frigid Aridic Ustifluvents
Hedoes-----	Coarse-loamy, mixed Pachic Haploborolls
Hillon-----	Fine-loamy, mixed (calcareous), frigid Aridic Ustorthents
Joplin-----	Fine-loamy, mixed Aridic Argiborolls
Kenilworth-----	Fine-loamy, mixed Aridic Argiborolls
Kevin-----	Fine-loamy, mixed Aridic Argiborolls
Klayent-----	Fine, mixed (calcareous), frigid Fluvaquentic Endoaquolls
Kobase-----	Fine, montmorillonitic, frigid Aridic Ustochrepts
Kremlin-----	Fine-loamy, mixed Aridic Haploborolls
Lacey Creek-----	Fine-loamy, mixed Pachic Udic Argiborolls
Lambeth-----	Fine-silty, mixed (calcareous), frigid Aridic Ustorthents
*Lardell-----	Fine-loamy, mixed, frigid Aquollic Salorthids
Libeg-----	Loamy-skeletal, mixed Argic Cryoborolls
Lihen-----	Sandy, mixed Entic Haploborolls

Classification of the Soils--Continued

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics that are outside the range of the series)

Soil name	Family or higher taxonomic class
Linnet-----	Fine, montmorillonitic Ustertic Argiborolls
Linwell-----	Fine, montmorillonitic Typic Haploborolls
Lonesome-----	Sandy over loamy, mixed (calcareous), frigid Aridic Ustorthents
Lonna-----	Fine-silty, mixed, frigid Aridic Ustochrepts
Lubrecht-----	Fine, mixed Glossic Eutroboralfs
Macar-----	Fine-loamy, mixed, frigid Typic Ustochrepts
Marcott-----	Fine, mixed Aquic Haploborolls
Marias-----	Fine, montmorillonitic, frigid Chromic Udic Haplusterts
Marmarth-----	Fine-loamy, mixed Aridic Argiborolls
Martinsdale-----	Fine-loamy, mixed Typic Argiborolls
Marvan-----	Fine, montmorillonitic, frigid Sodic Haplusterts
McIlwaine-----	Coarse-loamy over sandy or sandy-skeletal, mixed Cumulic Haploborolls
Megonot-----	Fine, montmorillonitic, frigid Aridic Ustochrepts
Neldore-----	Clayey, montmorillonitic (nonacid), frigid, shallow Aridic Ustorthents
Nesda-----	Sandy-skeletal, mixed Fluventic Haploborolls
Nishon-----	Fine, montmorillonitic, frigid Typic Albaqualfs
Nobe-----	Fine, montmorillonitic (calcareous), frigid Oxyaquic Ustorthents
Norbert-----	Clayey, montmorillonitic (calcareous), frigid, shallow Typic Ustorthents
Pendroy-----	Very-Fine, montmorillonitic, frigid Chromic Udic Haplusterts
Perma-----	Loamy-skeletal, mixed Typic Haploborolls
Phillips-----	Fine, montmorillonitic Typic Eutroboralfs
Reeder-----	Fine-loamy, mixed Typic Argiborolls
Rivra-----	Sandy-skeletal, mixed, frigid Aridic Ustifluvents
Roy-----	Clayey-skeletal, mixed Typic Argiborolls
Sagedale-----	Fine, montmorillonitic, frigid Typic Ustochrepts
Savage-----	Fine, montmorillonitic Typic Argiborolls
Scobey-----	Fine, montmorillonitic Aridic Argiborolls
Shambo-----	Fine-loamy, mixed Typic Haploborolls
Shane-----	Fine, montmorillonitic Abruptic Argiborolls
Straw-----	Fine-loamy, mixed Cumulic Haploborolls
Sunburst-----	Fine, montmorillonitic (calcareous), frigid Aridic Ustorthents
Sweetgrass-----	Clayey over sandy or sandy-skeletal, montmorillonitic Typic Argiborolls
Tally-----	Coarse-loamy, mixed Typic Haploborolls
Tamaneen-----	Fine, montmorillonitic Typic Argiborolls
Tanna-----	Fine, montmorillonitic Aridic Argiborolls
Telstad-----	Fine-loamy, mixed Aridic Argiborolls
Thoeny-----	Fine, montmorillonitic Typic Natriboralfs
Tinsley-----	Sandy-skeletal, mixed, frigid Typic Ustorthents
Toston-----	Fine-loamy, mixed, frigid Typic Natriboralfs
Turner-----	Fine-loamy over sandy or sandy-skeletal, mixed Typic Argiborolls
Twilight-----	Coarse-loamy, mixed, frigid Aridic Ustochrepts
Vanda-----	Fine, montmorillonitic (calcareous), frigid Aridic Ustorthents
Vebar-----	Coarse-loamy, mixed Typic Haploborolls
Vida-----	Fine-loamy, mixed Typic Argiborolls
Waltham-----	Fine, montmorillonitic Typic Natriboralfs
Warwood-----	Fine-loamy, mixed Glossic Cryoboralfs
Wayden-----	Clayey, montmorillonitic (calcareous), frigid, shallow Typic Ustorthents
Weingart-----	Fine, montmorillonitic Typic Natriboralfs
Whitlash-----	Loamy-skeletal, mixed Lithic Haploborolls
Williams-----	Fine-loamy, mixed Typic Argiborolls
Winifred-----	Fine, montmorillonitic Typic Haploborolls
Winkler-----	Loamy-skeletal, mixed, frigid Typic Ustochrepts
Work-----	Fine, montmorillonitic Typic Argiborolls
Yamacall-----	Fine-loamy, mixed, frigid Aridic Ustochrepts
Yawdim-----	Clayey, montmorillonitic (calcareous), frigid, shallow Aridic Ustorthents
Yetull-----	Mixed, frigid Typic Ustipsamments
Zahill-----	Fine-loamy, mixed (calcareous), frigid Typic Ustorthents

* Taxadjunct

Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
2	Riverwash-----	2,120	*
2B	Marcott-Bigsandy complex, 0 to 4 percent slopes-----	4,085	0.2
12C	Beaverton complex, 2 to 8 percent slopes-----	1,506	*
13C	Tanna clay loam, 2 to 8 percent slopes-----	916	*
15E	Lambeth silt loam, 8 to 25 percent slopes-----	7,275	0.3
15F	Lambeth silt loam, 25 to 70 percent slopes-----	21,025	0.8
16B	Degrad loam, 0 to 4 percent slopes-----	1,869	*
17B	Delpoint loam, 0 to 4 percent slopes-----	1,347	*
21E	Cabbart-Delpoint loams, 8 to 25 percent slopes-----	3,771	0.1
22F	Hillon loam, 25 to 60 percent slopes-----	44,024	1.7
27B	Attewan loam, 0 to 4 percent slopes-----	3,457	0.1
28	Nishon clay loam, 0 to 1 percent slopes-----	14,650	0.6
30B	Marvan clay, 0 to 4 percent slopes-----	22,124	0.9
30C	Marvan clay, 4 to 8 percent slopes-----	4,545	0.2
31A	Ferd loam, 0 to 2 percent slopes-----	2,632	0.1
32B	Kobase silty clay loam, 0 to 4 percent slopes-----	16,978	0.7
32C	Kobase silty clay loam, 4 to 8 percent slopes-----	7,196	0.3
32D	Kobase silty clay loam, 8 to 15 percent slopes-----	1,376	*
33A	Phillips loam, 0 to 2 percent slopes-----	13,354	0.5
34A	Linnet silty clay, 0 to 2 percent slopes-----	3,802	0.2
35B	Assinniboine fine sandy loam, 0 to 4 percent slopes-----	5,710	0.2
36B	Chinook fine sandy loam, 0 to 4 percent slopes-----	9,341	0.4
36C	Chinook fine sandy loam, 4 to 8 percent slopes-----	3,128	0.1
37B	Evanston loam, 0 to 4 percent slopes-----	60,419	2.4
37C	Evanston loam, 4 to 8 percent slopes-----	7,443	0.3
38B	Ethridge silty clay loam, 0 to 4 percent slopes-----	52,128	2.1
39B	Assinniboine loam, 0 to 4 percent slopes-----	1,822	*
43A	Pendroy clay, 0 to 2 percent slopes-----	5,139	0.2
44B	Kevin clay loam, 0 to 4 percent slopes-----	3,631	0.1
47B	Marias silty clay, 0 to 4 percent slopes-----	22,638	0.9
47C	Marias silty clay, 4 to 8 percent slopes-----	1,078	*
48A	Vanda clay, 0 to 2 percent slopes-----	1,561	*
48C	Vanda clay, 2 to 8 percent slopes-----	1,120	*
50A	Telstad loam, 0 to 2 percent slopes-----	45,985	1.8
55B	Lihen loamy fine sand, 0 to 6 percent slopes-----	2,645	0.1
56A	Scokey clay loam, 0 to 2 percent slopes-----	14,782	0.6
57B	Absarokee clay loam, 0 to 4 percent slopes-----	1,262	*
57C	Absarokee clay loam, 4 to 8 percent slopes-----	660	*
57E	Absarokee-Reeder complex, 8 to 25 percent slopes-----	2,844	0.1
58B	Lonna silty clay loam, 0 to 4 percent slopes-----	6,652	0.3
58C	Lonna silty clay loam, 4 to 8 percent slopes-----	3,668	0.1
60A	Havre loam, 0 to 2 percent slopes-----	8,516	0.3
63	Lardell silty clay, 0 to 1 percent slopes-----	1,180	*
67B	Bearpaw clay loam, 0 to 4 percent slopes-----	38,955	1.5
67C	Bearpaw clay loam, 4 to 8 percent slopes-----	1,701	*
68B	Gerber silty clay, 0 to 4 percent slopes-----	9,253	0.4
69C	Vida-Zahill clay loams, 2 to 8 percent slopes-----	5,924	0.2
71D	Roy very cobbly clay loam, 2 to 15 percent slopes-----	1,081	*
72F	Zahill clay loam, 25 to 60 percent slopes-----	23,758	0.9
73B	Yetull-Lonesome loamy fine sands, 0 to 6 percent slopes-----	2,085	*
74C	Shambo loam, 2 to 8 percent slopes-----	1,956	*
75B	Farnuf loam, 0 to 4 percent slopes-----	6,952	0.3
75C	Farnuf loam, 4 to 8 percent slopes-----	5,640	0.2
76C	Hedoes loam, 2 to 8 percent slopes-----	3,079	0.1
77F	Tinsley gravelly sandy loam, 15 to 45 percent slopes-----	1,881	*
79B	Yamacall loam, 0 to 4 percent slopes-----	5,563	0.2
79C	Yamacall loam, 4 to 8 percent slopes-----	10,074	0.4
79D	Yamacall loam, 8 to 15 percent slopes-----	4,556	0.2
81A	Glendive sandy loam, 0 to 2 percent slopes-----	1,479	*
82B	Savage silty clay loam, 0 to 4 percent slopes-----	12,706	0.5
86B	Work clay loam, 0 to 4 percent slopes-----	2,799	0.1

* See footnote at end of table.

Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Acres	Percent
86C	Work clay loam, 4 to 8 percent slopes-----	7,288	0.3
86D	Work clay loam, 8 to 15 percent slopes-----	1,928	*
87B	Tamaneen clay loam, 0 to 4 percent slopes-----	3,010	0.1
88C	Perma gravelly loam, 2 to 8 percent slopes-----	503	*
90A	Harlake silty clay, 0 to 1 percent slopes-----	2,176	*
92E	Sunburst-Bascovy complex, 8 to 25 percent slopes-----	1,123	*
93F	Yetull fine sandy loam, 15 to 45 percent slopes-----	4,229	0.2
94B	Busby fine sandy loam, 0 to 4 percent slopes-----	1,238	*
94C	Busby fine sandy loam, 4 to 8 percent slopes-----	3,064	0.1
94D	Busby fine sandy loam, 8 to 15 percent slopes-----	1,605	*
96B	Macar loam, 0 to 4 percent slopes-----	1,971	*
96C	Macar loam, 4 to 8 percent slopes-----	2,642	0.1
98B	Kremlin loam, 0 to 4 percent slopes-----	11,063	0.4
98C	Kremlin loam, 4 to 8 percent slopes-----	2,022	*
99	Rivra-Hanly complex, 0 to 2 percent slopes-----	2,887	0.1
110C	Laceycreek loam, 2 to 8 percent slopes-----	1,085	*
110D	Laceycreek loam, 8 to 15 percent slopes-----	937	*
110E	Laceycreek loam, 15 to 25 percent slopes-----	893	*
130A	Nesda-McIlwaine complex, 0 to 2 percent slopes-----	3,381	0.1
140A	Klayent clay loam, 0 to 1 percent slopes-----	1,096	*
141B	Megonot-Weingart-Delpoint complex, 0 to 4 percent slopes-----	1,670	*
142C	Megonot-Kobase-Delpoint complex, 2 to 8 percent slopes-----	2,543	0.1
160A	Bigsandy loam, 0 to 1 percent slopes-----	2,828	0.1
171C	Delpoint-Cabbart loams, 2 to 8 percent slopes-----	957	*
180A	McIlwaine-Nesda-Straw complex, 0 to 2 percent slopes-----	1,732	*
182F	Megonot-Yawdim silty clay loams, 25 to 60 percent slopes-----	5,050	0.2
200	Badland-----	22,661	0.9
201F	Cabba-Wayden-Rock outcrop complex, 25 to 70 percent slopes-----	2,474	*
210C	Shane-Gerber complex, 2 to 8 percent slopes-----	822	*
210E	Shane-Barkof-Gerber complex, 8 to 25 percent slopes-----	1,697	*
211F	Cabbart-Yawdim-Rock outcrop complex, 25 to 70 percent slopes-----	50,733	2.0
212F	Cabbart-Hillon loams, 25 to 70 percent slopes-----	18,142	0.7
221E	Hillon-Kevin clay loams, 8 to 25 percent slopes-----	31,502	1.2
222D	Hillon-Delpoint loams, 8 to 25 percent slopes-----	3,811	0.2
223E	Hillon-Fleak complex, 15 to 35 percent slopes-----	4,880	0.2
224E	Hillon-Joplin loams, 8 to 25 percent slopes-----	26,106	1.0
227F	Hillon-Fleak-Rock outcrop complex, 25 to 70 percent slopes-----	1,905	*
229E	Hillon-Lambeth complex, 15 to 35 percent slopes-----	906	*
232A	Acel silty clay loam, 0 to 2 percent slopes-----	4,270	0.2
251C	Bascovy-Neldore silty clays, 2 to 8 percent slopes-----	2,661	0.1
251E	Bascovy-Neldore silty clays, 8 to 25 percent slopes-----	22,467	0.9
252C	Bascovy-Marvan silty clays, 2 to 8 percent slopes-----	6,332	0.2
261B	Absher-Nobe complex, 0 to 4 percent slopes-----	2,466	*
263A	Toston clay loam, 0 to 1 percent slopes-----	4,359	0.2
264A	Toston-Nobe complex, 0 to 1 percent slopes-----	2,158	*
265B	Absher-Gerdrum complex, 0 to 4 percent slopes-----	1,002	*
272C	Attewan-Tinsley complex, 2 to 8 percent slopes-----	5,603	0.2
301A	Marvan-Vanda clays, 0 to 2 percent slopes-----	1,799	*
301C	Marvan-Vanda clays, 2 to 8 percent slopes-----	10,907	0.4
303A	Flatcreek-Nobe silty clays, 0 to 2 percent slopes-----	3,753	0.1
305A	Marvan-Nobe clays, 0 to 2 percent slopes-----	1,302	*
311B	Ferd-Creed-Gerdrum complex, 0 to 4 percent slopes-----	19,221	0.8
311C	Ferd-Creed-Gerdrum complex, 4 to 8 percent slopes-----	3,190	0.1
323B	Sagedale silty clay loam, 0 to 4 percent slopes-----	6,099	0.2
323C	Sagedale silty clay loam, 4 to 8 percent slopes-----	4,998	0.2
324B	Marcott silty clay loam, 0 to 3 percent slopes-----	1,684	*
331B	Phillips-Elloam complex, 0 to 4 percent slopes-----	50,219	2.0
331C	Phillips-Elloam complex, 4 to 8 percent slopes-----	7,260	0.3
334B	Phillips-Kevin complex, 0 to 4 percent slopes-----	4,837	0.2
341B	Lirnet-Marias silty clays, 0 to 4 percent slopes-----	3,727	0.1
351B	Kenilworth-Fortbenton fine sandy loams, 0 to 3 percent slopes-----	16,829	0.7

*See footnote at end of table.

Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Acres	Percent
361B	Fortbenton fine sandy loam, 0 to 4 percent slopes-----	29,039	1.1
362C	Chinook-Yetull complex, 2 to 10 percent slopes-----	5,798	0.2
363B	Cozberg-Chinook fine sandy loams, 0 to 4 percent slopes-----	2,069	*
363C	Chinook-Lihen fine sandy loams, 2 to 10 percent slopes-----	5,389	0.2
364B	Chinook loam, 0 to 4 percent slopes-----	2,156	*
364C	Chinook loam, 4 to 8 percent slopes-----	852	*
365B	Fortbenton-Chinook fine sandy loams, 0 to 6 percent slopes-----	8,065	0.3
368C	Fortbenton-Hillon complex, 2 to 8 percent slopes-----	5,339	0.2
372C	Evanston-Yamacall loams, 2 to 8 percent slopes-----	1,973	*
375B	Evanston-Lonna loams, 0 to 4 percent slopes-----	4,796	0.2
377B	Evanston-Degrad loams, 0 to 4 percent slopes-----	1,550	*
381B	Ethridge clay loam, 0 to 4 percent slopes-----	3,877	0.2
385B	Ethridge-Kobase silty clay loams, 0 to 4 percent slopes-----	31,719	1.2
386B	Ethridge-Evanston complex, 0 to 4 percent slopes-----	1,575	*
388A	Ethridge-Lonna silty clay loams, 0 to 2 percent slopes-----	14,557	0.6
402A	Gerdrum-Absher-Creed complex, 0 to 2 percent slopes-----	9,109	0.4
410	Rock outcrop-Fleak complex, 25 to 70 percent slopes-----	1,396	*
411D	Farnuf-Reeder loams, 4 to 15 percent slopes-----	3,782	0.1
411E	Reeder-Farnuf loams, 8 to 25 percent slopes-----	9,993	0.4
421C	Joplin-Hillon loams, 2 to 8 percent slopes-----	30,763	1.2
422C	Marmarth loam, 2 to 8 percent slopes-----	2,034	*
441C	Kevin-Hillon clay loams, 2 to 8 percent slopes-----	38,269	1.5
442C	Kevin-Elloam clay loams, 2 to 8 percent slopes-----	7,130	0.3
444D	Kevin-Scobey clay loams, 8 to 15 percent slopes-----	3,786	0.1
451C	Turner-Beaverton complex, 2 to 8 percent slopes-----	1,383	*
460	Laceycreek loam, 8 to 25 percent slopes, moist-----	3,365	0.1
471B	Marias-Kobase complex, 0 to 4 percent slopes-----	14,353	0.6
481A	Bigsag silty clay, 0 to 2 percent slopes-----	4,417	0.2
493A	Enbar-Straw-Eagleton loams, 0 to 2 percent slopes-----	3,613	0.1
503B	Telstad-Joplin loams, 0 to 4 percent slopes-----	187,597	7.4
503C	Telstad-Joplin loams, 4 to 8 percent slopes-----	67,827	2.7
510	Rock outcrop-Belain complex, 15 to 45 percent slopes-----	2,107	*
511A	Martinsdale-Turner loams, 0 to 2 percent slopes-----	1,835	*
511C	Martinsdale loam, 2 to 8 percent slopes-----	1,623	*
512C	Martinsdale stony loam, 4 to 15 percent slopes-----	1,313	*
521B	Thoeny-Elloam-Absher complex, 0 to 4 percent slopes-----	7,630	0.3
530F	Warwood loam, 15 to 45 percent slopes-----	681	*
531A	Sweetgrass-Beaverton complex, 0 to 2 percent slopes-----	5,409	0.2
531C	Sweetgrass-Beaverton complex, 2 to 8 percent slopes-----	3,747	0.1
550F	Libeg-Arrowpeak-Elkner complex, 25 to 70 percent slopes-----	13,091	0.5
551B	Lonesome loamy fine sand, 0 to 6 percent slopes-----	1,744	*
560F	Elve-Rock outcrop complex, 25 to 70 percent slopes-----	1,438	*
561B	Scobey-Kevin clay loams, 0 to 4 percent slopes-----	174,784	6.9
561C	Scobey-Kevin clay loams, 4 to 8 percent slopes-----	68,709	2.7
562B	Scobey-Linnet complex, 0 to 4 percent slopes-----	17,169	0.7
563A	Fortbenton-Scobey fine sandy loams, 0 to 3 percent slopes-----	9,399	0.4
580F	Garlet-Elkner complex, 25 to 70 percent slopes-----	11,083	0.4
601A	Havre-Glendive complex, 0 to 1 percent slopes-----	2,171	*
602A	Havre silty clay loam, 0 to 1 percent slopes-----	3,808	0.2
603A	Havre-Glendive complex, 0 to 2 percent slopes, occasionally flooded-----	13,928	0.6
605C	Yamacall-Havre loams, 0 to 8 percent slopes-----	22,322	0.9
621E	Sagedale-Wayden silty clay loams, 8 to 25 percent slopes-----	6,689	0.3
621F	Wayden-Sagedale silty clay loams, 25 to 60 percent slopes-----	13,757	0.5
623F	Linwell-Winifred clay loams, 15 to 45 percent slopes-----	9,432	0.4
630E	Crow-Lubrecht loams, 8 to 35 percent slopes-----	1,215	*
641F	Norbert-Barkof silty clays, 25 to 60 percent slopes-----	4,108	0.2
650D	Laceycreek-Ambrant complex, 4 to 15 percent slopes-----	298	*
650F	Laceycreek-Eaglecreek loams, 15 to 45 percent slopes-----	1,653	*
653F	Fleak-Twilight-Yetull complex, 25 to 70 percent slopes-----	4,918	0.2
654F	Fleak-Twilight-Rock outcrop complex, 25 to 70 percent slopes-----	6,130	0.2
661E	Twilight-Fleak complex, 8 to 25 percent slopes-----	7,427	0.3

* See footnote at end of table.

Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Acres	Percent
671B	Bearpaw-Vida clay loams, 0 to 4 percent slopes-----	144,043	5.7
671C	Bearpaw-Vida clay loams, 4 to 8 percent slopes-----	66,411	2.6
673A	Bearpaw-Daglum complex, 0 to 2 percent slopes-----	1,003	*
674B	Bearpaw-Waltham clay loams, 0 to 4 percent slopes-----	5,886	0.2
680F	Winkler-Ambrant complex, 25 to 60 percent slopes-----	4,796	0.2
681C	Gerber clay, 4 to 8 percent slopes-----	994	*
691D	Vida-Williams loams, 8 to 15 percent slopes-----	2,575	0.1
692D	Vida-Bearpaw clay loams, 4 to 15 percent slopes-----	11,226	0.4
693C	Vida-Bearpaw-Nishon clay loams, 0 to 15 percent slopes-----	5,105	0.2
701E	Work-Absarokee clay loams, 8 to 25 percent slopes-----	8,721	0.3
702E	Work-Absarokee stony loams, 8 to 35 percent slopes-----	6,367	0.2
721E	Zahill-Vida clay loams, 8 to 25 percent slopes-----	23,497	0.9
722F	Zahill-Sagedale-Wayden complex, 15 to 45 percent slopes-----	5,118	0.2
723F	Zahill-Cabba complex, 15 to 45 percent slopes-----	4,987	0.2
731F	Yetull-Dune land complex, 15 to 45 percent slopes-----	299	*
741B	Shambo-Straw loams, 0 to 4 percent slopes-----	3,710	0.1
745F	Shambo-Amor-Cabba loams, 15 to 45 percent slopes-----	12,545	0.5
761C	Hedoes-Belain loams, 2 to 8 percent slopes-----	651	*
761E	Hedoes-Belain loams, 8 to 25 percent slopes-----	7,764	0.3
793B	Yamacall clay loam, 0 to 4 percent slopes-----	4,120	0.2
793C	Yamacall clay loam, 4 to 8 percent slopes-----	1,740	*
795C	Yamacall-Benz clay loams, 2 to 8 percent slopes-----	2,667	0.1
795D	Yamacall-Benz clay loams, 8 to 15 percent slopes-----	1,111	*
801B	Williams-Vida loams, 0 to 4 percent slopes-----	4,776	0.2
801C	Williams-Vida loams, 4 to 8 percent slopes-----	6,054	0.2
828A	Savage loam, 0 to 2 percent slopes-----	1,095	*
842A	Savage-Daglum complex, 0 to 2 percent slopes-----	1,869	*
863E	Work-Roy complex, 8 to 25 percent slopes-----	3,989	0.2
871B	Tamaneen cobbly clay loam, 0 to 4 percent slopes-----	2,017	*
871C	Tamaneen cobbly clay loam, 4 to 8 percent slopes-----	502	*
883F	Perma-Whitlash complex, 25 to 70 percent slopes-----	18,668	0.7
892F	Whitlash-Belain-Rock outcrop complex, 25 to 60 percent slopes-----	2,334	*
895F	Belain-Whitlash, moist-Hedoes complex, 15 to 60 percent slopes-----	18,124	0.7
896E	Belain-Whitlash-Rock outcrop complex, 8 to 25 percent slopes-----	1,091	*
911F	Belain-Whitlash-Hedoes complex, 15 to 45 percent slopes-----	34,432	1.4
916C	Belain-Hedoes sandy loams, 2 to 8 percent slopes-----	1,228	*
925F	Sunburst-Lambeth complex, 25 to 70 percent slopes-----	17,765	0.7
941D	Busby-Twilight fine sandy loams, 4 to 15 percent slopes-----	3,895	0.2
943C	Tally fine sandy loam, 2 to 8 percent slopes-----	1,956	*
943E	Tally-Vebar fine sandy loams, 8 to 25 percent slopes-----	3,757	0.1
943F	Tally-Cohagen fine sandy loams, 25 to 60 percent slopes-----	3,506	0.1
965F	Cabba-Macar loams, 15 to 60 percent slopes-----	10,922	0.4
971F	Neldore-Bascovy silty clays, 25 to 60 percent slopes-----	48,125	1.9
972F	Neldore-Rock outcrop complex, 25 to 70 percent slopes-----	31,926	1.3
974F	Neldore-Hillon complex, 25 to 70 percent slopes-----	33,087	1.3
DA	Denied access-----	4,800	0.2
M-W	Miscellaneous Water-----	30	*
W	Water-----	15,060	0.6
	Total-----	2,526,082	100.0

* Less than 0.1 percent.

Soil Series and Detailed Map Units

In this section, arranged in alphabetical order, each soil series recognized in the survey area is described. Each description is followed by the detailed soil map units associated with the series.

Characteristics of the soil and the material in which it formed are identified for each soil series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (Soil Survey Staff, 1993). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (USDA-NRCS, 1999). Unless otherwise stated, colors in the descriptions are for dry soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units on the detailed maps in Part III of this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses. More information about each map unit is given in Part II of this survey.

A map unit delineation on the detailed soil maps represents an area on the landscape and consists of one or more soils or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils or miscellaneous areas. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils and miscellaneous areas are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without minor component areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some "minor component" areas that belong to other taxonomic classes.

Minor component soil areas have properties and behavioral characteristics divergent enough to affect use or to require different management. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. A few minor component areas may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor component areas in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but if intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying layers, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying layers. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature

that affects use or management. For example, Martinsdale stony loam, 4 to 15 percent slopes, is one of several phases in the Martinsdale series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Scobey-Kevin clay loams, 0 to 4 percent slopes is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Associations were not mapped in this survey area.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Undifferentiated groups were not mapped in this survey area.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Badland is an example.

The table "Acreage and Proportionate Extent of the Soils" in Parts I and II of the manuscript gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The "Glossary" defines many of the terms used in describing the soils or miscellaneous areas.

Absarokee Series

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Permeability: Moderately slow (0.2 to 0.6 inch/hour)

Landform: Sedimentary plains, hills

Parent material: Residuum from interbedded sandstone and shale

Slope range: 0 to 35 percent

Annual precipitation: 17 to 19 inches

Annual air temperature: 41 to 44 degrees F

Frost-free period: 90 to 110 days

Taxonomic Class: Fine, montmorillonitic Typic Argiborolls

Typical Pedon

Absarokee clay loam, 4 to 8 percent slopes, in cropland, 1,200 feet north and 50 feet west of the southeast corner of sec. 33, T. 21 N., R. 7 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; strong fine and medium granular structure; slightly hard, very friable, sticky and plastic; common fine and very fine roots; slightly acid; abrupt smooth boundary.

Bt1—7 to 13 inches; yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 4/4) moist; strong medium prismatic structure parting to strong fine subangular blocky; very hard, friable, sticky and plastic; common fine and very fine roots; many very fine tubular pores; many distinct clay films on faces of peds; neutral; clear wavy boundary.

Bt2—13 to 18 inches; light yellowish brown (10YR 6/4) clay loam, yellowish brown (10YR 5/4) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; very hard, friable, sticky and plastic; common very fine roots; many very fine tubular pores; many distinct clay films on faces of peds; neutral; clear wavy boundary.

Bk—18 to 34 inches; very pale brown (10YR 7/3) clay loam, light yellowish brown (10YR 6/4) moist; weak medium prismatic structure parting to weak fine and medium subangular blocky; hard, friable, sticky and plastic; few very fine roots; many very fine tubular pores; common fine and few medium masses of lime; violently effervescent; moderately alkaline; gradual irregular boundary.

Cr—34 to 60 inches; very pale brown (10YR 7/4) and light gray (10YR 7/2) interbedded sandstone and shale, light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) moist; strongly effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 12 inches

Content of clay in the control section: 35 to 50 percent

Depth to bedrock: 20 to 40 inches

Depth to the Bk horizon: 12 to 24 inches

Ap horizon

Hue: 2.5Y, 10YR, or 7.5YR

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 2 or 3

Texture: loam or clay loam

Clay content: 20 to 35 percent

Rock fragments: 0 to 35 percent—0 to 25 percent
stones and cobbles, 0 to 10 percent pebbles

Reaction: pH 6.1 to 7.3

Bt1 horizon

Hue: 2.5Y, 10YR, or 7.5YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2, 3, or 4

Texture: clay loam or clay

Clay content: 35 to 50 percent

Rock fragments: 0 to 10 percent—0 to 5 percent
stones and cobbles, 0 to 5 percent pebbles

Reaction: pH 6.6 to 7.8

Bt2 horizon

Hue: 2.5Y, 10YR, or 7.5YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 3 or 4

Texture: clay loam or clay

Clay content: 35 to 50 percent

Rock fragments: 0 to 10 percent—0 to 5 percent
stones and cobbles, 0 to 5 percent pebbles

Reaction: pH 6.6 to 7.8

Bk horizon

Hue: 2.5Y, 10YR, or 7.5YR

Value: 6, 7, or 8 dry; 5, 6, or 7 moist

Chroma: 3 or 4

Clay content: 30 to 40 percent

Rock fragments: 0 to 35 percent—0 to 5 percent
stones and cobbles, 0 to 30 percent pebbles

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.4 to 8.4

57B—Absarokee clay loam, 0 to 4 percent slopes

Setting

Landform: Sedimentary plains

Slope: 0 to 4 percent

Mean annual precipitation: 17 to 19 inches

Frost-free period: 90 to 110 days

Composition

Major Components

Absarokee and similar soils: 85 percent

Minor Components

Work and similar soils: 0 to 7 percent

Soils shallow to bedrock: 0 to 5 percent

Very channery surface layers: 0 to 3 percent

Major Component Description

Surface layer texture: Clay loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Interbedded sandstone and
shale residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.9 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

57C—Absarokee clay loam, 4 to 8 percent slopes

Setting

Landform: Sedimentary plains

Slope: 4 to 8 percent

Mean annual precipitation: 17 to 19 inches

Frost-free period: 90 to 110 days

Composition

Major Components

Absarokee and similar soils: 85 percent

Minor Components

Work and similar soils: 0 to 7 percent

Soils shallow to bedrock: 0 to 5 percent

Very channery surface layers: 0 to 3 percent

Major Component Description

Surface layer texture: Clay loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Interbedded sandstone and shale residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.9 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

57E—Absarokee-Reeder complex, 8 to 25 percent slopes

Setting

Landform:

* Absarokee—Hills

* Reeder—Hills

Slope:

* Absarokee—8 to 25 percent

* Reeder—8 to 25 percent

Mean annual precipitation: 17 to 19 inches

Frost-free period: 90 to 110 days

Composition

Major Components

Absarokee and similar soils: 50 percent

Reeder and similar soils: 35 percent

Minor Components

Soils shallow to bedrock: 0 to 5 percent

Work and similar soils: 0 to 3 percent

Farnuf and similar soils: 0 to 3 percent

Very channery soils: 0 to 2 percent

Slopes more than 25 percent: 0 to 2 percent

Major Component Description

Absarokee

Surface layer texture: Clay loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Interbedded sandstone and shale residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.9 inches

Reeder

Surface layer texture: Loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Interbedded sandstone and shale residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.6 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Absher Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Moderately well drained or well drained

Permeability: Very slow (<0.06 inch/hour)

Landform: Alluvial fans, stream terraces, small drainageways, till plains

Parent material: Glaciofluvial deposits, glacial till

Slope range: 0 to 4 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Fine, montmorillonitic Typic Natriboralfs

Typical Pedon

Absher clay, in an area of Absher-Nobe complex, 0 to 4 percent slopes, in rangeland, 1,250 feet north and 300 feet west of the southeast corner of sec. 16, T. 28 N., R. 13 E.

E—0 to 2 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; moderate thin platy structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; neutral; clear smooth boundary.

Btn—2 to 8 inches; grayish brown (10YR 5/2) clay, dark grayish brown (10YR 4/2) moist; strong medium columnar structure parting to strong fine and medium subangular blocky; very hard, very firm, very sticky and very plastic; common very fine and fine roots along faces of peds; common very fine tubular pores; many distinct clay films on

faces of peds; many unstained sand grains on tops of columns; mildly alkaline; clear smooth boundary.

Bt_{nyz}—8 to 11 inches; grayish brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; hard, very firm, sticky and plastic; common very fine and fine roots; common very fine tubular pores; many distinct clay films on faces of peds; common fine seams and masses of gypsum and other salts; slightly effervescent; moderately alkaline; clear wavy boundary.

Bk_{nyz}1—11 to 15 inches; brown (10YR 5/3) silty clay loam, dark brown (10YR 4/3) moist; weak medium prismatic structure parting to moderate fine and medium subangular blocky; hard, firm, sticky and plastic; common very fine roots; common very fine tubular pores; common fine seams and masses of gypsum and other salts; few fine seams of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bk_{nyz}2—15 to 42 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; massive; very hard, firm, very sticky and very plastic; few very fine tubular pores; common fine and medium seams and masses of lime, gypsum and other salts; strongly effervescent; strongly alkaline; gradual wavy boundary.

B_{nyz}—42 to 60 inches; light gray (2.5Y 7/2) silty clay loam, grayish brown (2.5Y 5/2) moist; massive; very hard, firm, sticky and plastic; few very fine tubular pores; common fine and medium seams and masses of gypsum and other salts; strongly effervescent; strongly alkaline.

Range in Characteristics

Control section: 2 to 11 inches

Content of clay in the control section: 35 to 60 percent

Depth to the B_{tny} horizon: 6 to 15 inches

E horizon

Hue: 2.5Y, 10YR, or 7.5YR

Value: 6 or 7 dry; 3, 4, or 5 moist

Chroma: 1, 2, or 3

Texture: the surface layer is clay when mixed to 7 inches

Clay content: 40 to 55 percent

Electrical conductivity: 4 to 8 mmhos/cm

Reaction: pH 6.6 to 8.4

B_{tn} horizon

Hue: 2.5Y, 7.5YR, or 10YR

Value: 4, 5, or 6 dry; 4 or 5 moist

Chroma: 1, 2, or 3

Texture: silty clay, clay, or clay loam

Clay content: 35 to 60 percent

Structure: moderate or strong columnar or prismatic

Consistence: very hard or extremely hard when dry

Rock fragments: 0 to 15 percent pebbles

Electrical conductivity: 8 to 16 mmhos/cm

Sodium adsorption ratio: 18 to 70

Reaction: pH 7.4 to 9.0

B_{tny} horizon

Hue: 2.5Y, 10YR, or 7.5YR

Value: 4, 5, or 6 dry; 4 or 5 moist

Chroma: 2 or 3

Texture: clay loam, clay, or silty clay

Clay content: 35 to 50 percent

Rock fragments: 0 to 20 percent pebbles

Calcium carbonate equivalent: 5 to 15 percent

Electrical conductivity: 8 to 16 mmhos/cm

Sodium adsorption ratio: 18 to 70

Gypsum content: 1 to 5 percent

Reaction: pH 7.9 to 9.0

Some pedons have B_{knyz} horizons.

B_{knyz} and B_{nyz} horizons

Hue: 2.5Y, 10YR, or 7.5YR

Value: 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 2, 3, or 4

Texture: clay loam, silty clay, clay, or silty clay loam

Clay content: 35 to 50 percent

Rock fragments: 0 to 20 percent pebbles

Calcium carbonate equivalent: 4 to 15 percent

Electrical conductivity: 16 to 30 mmhos/cm

Sodium adsorption ratio: 23 to 70

Gypsum content: 1 to 5 percent

Reaction: pH 7.9 to 9.0

265B—Absher-Gerdrum complex, 0 to 4 percent slopes

Setting

Landform:

* Absher—Alluvial fans, stream terraces, and drainageways

* Gerdrum—Alluvial fans, stream terraces, and drainageways

Position on landform:

- * Absher—Microlows
- * Gerdrum—Microhighs

Slope:

- * Absher—0 to 4 percent
- * Gerdrum—0 to 4 percent

Mean annual precipitation: 11 to 14 inches*Frost-free period:* 105 to 125 days**Composition****Major Components**

Absher and similar soils: 55 percent
 Gerdrum and similar soils: 35 percent

Minor Components

Creed and similar soils: 0 to 5 percent
 Ferd and similar soils: 0 to 3 percent
 Very gravelly substratums: 0 to 2 percent

Major Component Description**Absher**

Surface layer texture: Clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciofluvial deposits
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 4.1 inches

Gerdrum

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciofluvial deposits
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 6.1 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

261B—Absher-Nobe complex, 0 to 4 percent slopes**Setting***Landform:*

- * Absher—Alluvial fans, stream terraces, and drainageways
- * Nobe—Alluvial fans, stream terraces, and drainageways

Position on landform:

- * Absher—Microlows
- * Nobe—Microhighs

Slope:

- * Absher—0 to 4 percent
- * Nobe—0 to 4 percent

Mean annual precipitation: 11 to 14 inches*Frost-free period:* 105 to 125 days**Composition****Major Components**

Absher and similar soils: 55 percent
 Nobe and similar soils: 35 percent

Minor Components

Gerdrum and similar soils: 0 to 7 percent
 Somewhat poorly drained soils: 0 to 3 percent

Major Component Description**Absher**

Surface layer texture: Clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciofluvial deposits
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 4.1 inches

Nobe

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Dominant parent material: Glaciofluvial deposits
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 4.5 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Acel Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Slow (0.06 to 0.2 inch/hour)

Landform: Poorly defined drainageways, alluvial fans, stream terraces

Parent material: Glaciofluvial deposits

Slope range: 0 to 2 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Fine, montmorillonitic Mollic Eutroboralfs

Typical Pedon

Acel silty clay loam, 0 to 2 percent slopes, in cropland, 200 feet west and 500 feet north of the southeast corner of sec. 36, T. 23 N., R. 4 E.

Ap—0 to 6 inches; grayish brown (10YR 5/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; strong fine and medium granular structure with a hard surface crust; massive when dry; hard, friable, sticky and plastic; few very fine roots; many unstained grains of silt and sand; neutral; abrupt smooth boundary.

Bt1—6 to 12 inches; grayish brown (10YR 5/2) silty clay, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, friable, sticky and very plastic; few very fine tubular pores; common distinct clay films on faces of peds; neutral; clear wavy boundary.

Bt2—12 to 20 inches; brown (10YR 5/3) silty clay, dark brown (10YR 4/3) moist; strong medium prismatic structure parting to moderate medium subangular blocky; hard, friable, sticky and very plastic; few very fine roots; many very fine tubular pores; many distinct clay films on faces of peds; neutral; gradual wavy boundary.

Bk1—20 to 26 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, friable, sticky and plastic; few very fine roots; many very fine and few fine tubular pores; few fine masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bk2—26 to 31 inches; light brownish gray (2.5Y 6/2) silty clay loam, grayish brown (2.5Y 5/2) moist; weak medium subangular blocky structure; hard, friable, sticky and plastic; many very fine and few fine tubular pores; few pebbles that have lime coats on undersides; common fine masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bck—31 to 60 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, friable, sticky and plastic; common very fine tubular pores; few fine seams and masses of lime; slightly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 40 to 55 percent

Depth to the Bk horizon: 15 to 25 inches

Ap horizon

Hue: 2.5Y or 10YR

Clay content: 27 to 35 percent

Rock fragments: 0 to 5 percent pebbles

Reaction: pH 6.6 to 7.8

Note: This horizon is hard or very hard and massive when dry. Some pedons have a thin E or transition horizon.

Bt horizons

Hue: 2.5Y or 10YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2 or 3

Texture: silty clay or clay

Clay content: 40 to 55 percent

Rock fragments: 0 to 5 percent pebbles

Reaction: pH 6.6 to 7.8

Bk and Bck horizons

Hue: 2.5Y or 10YR

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 2, 3, or 4

Texture: clay loam, silty clay loam, or silty clay

Clay content: 35 to 45 percent

Rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 15 percent pebbles
 Calcium carbonate equivalent: 1 to 15 percent
 Reaction: pH 7.9 to 9.0
 Some pedons have a By or Bky horizon below 40 inches.

232A—Acel silty clay loam, 0 to 2 percent slopes

Setting

Landform: Alluvial fans, stream terraces, and drainageways
Slope: 0 to 2 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Acel and similar soils: 85 percent

Minor Components

Ethridge and similar soils: 0 to 5 percent
 Acel clay loam: 0 to 3 percent
 Moderately saline soils: 0 to 3 percent
 Nishon and similar soils: 0 to 3 percent
 Stratified, sandy substratums: 0 to 1 percent

Major Component Description

Surface layer texture: Silty clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciofluvial deposits
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.5 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Ambrant Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Somewhat excessively drained
Permeability: Moderately rapid (2.0 to 6.0 inches/hour) to 43 inches; rapid below this depth (6.0 to 20.0 inches/hour)

Landform: Mountains, alluvial fans, stream terraces
Parent material: Residuum, colluvium, or alluvium from igneous rocks
Slope range: 4 to 60 percent
Annual precipitation: 18 to 24 inches
Annual air temperature: 40 to 43 degrees F
Frost-free period: 70 to 100 days

Taxonomic Class: Coarse-loamy, mixed, frigid Typic Ustochrepts

Typical Pedon

Ambrant sandy loam, in an area of Winkler-Ambrant complex, 25 to 60 percent slopes, in forest, 700 feet south and 1,600 feet west of the northeast corner of sec. 16, T. 28 N. R. 15 E.

O—3 inches to 0; slightly decomposed forest litter.

A—0 to 4 inches; dark grayish brown (10YR 4/2) sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky and moderate fine granular structure; soft, very friable, nonsticky and nonplastic; many fine and very fine roots and common medium and coarse roots; 10 percent small pebbles; neutral; clear smooth boundary.

E1—4 to 8 inches; light brownish gray (10YR 6/2) coarse sandy loam, dark grayish brown (10YR 4/2) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many fine and very fine roots; common medium and coarse roots; many very fine irregular pores and few fine irregular pores; 10 percent small pebbles; neutral; gradual wavy boundary.

E2—8 to 21 inches; pale brown (10YR 6/3) coarse sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many fine and very fine roots and common medium roots; many very fine irregular pores and common fine irregular pores; 10 percent small pebbles; neutral; gradual wavy boundary.

E and Bt—21 to 43 inches; E part (60 percent) pale brown (10YR 6/3) coarse sandy loam, brown (10YR 4/3) moist; B part (40 percent) brown (10YR 5/3) coarse sandy loam lamellae, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine, fine and medium roots; many very fine irregular pores and common medium pores; few dark yellowish brown (10YR 4/4) iron stains; 10 percent small pebbles; neutral; gradual wavy boundary.

2C—43 to 60 inches; light brownish gray (10YR 6/2) gravelly loamy coarse sand, dark grayish brown (10YR 4/2) moist; single grain; loose, very friable, nonsticky and nonplastic; few fine and very fine roots; many very fine irregular pores and common fine irregular pores; 25 percent pebbles; neutral.

Range in Characteristics

Content of clay in the control section: 15 to 18 percent
Rock fragments in the control section: 10 to 35 percent

A horizon

Value: 4 or 5 dry; 3 or 4 moist
 Chroma: 2 or 3
 Clay content: 5 to 15 percent
 Reaction: pH 5.6 to 7.3

E1 horizon

Value: 5, 6, or 7 dry; 3 or 4 moist
 Chroma: 2 or 3
 Texture: sandy loam or loam
 Clay content: 5 to 15 percent
 Rock fragments: 0 to 35 percent—0 to 25 percent cobbles, stones, or boulders; 5 to 35 percent angular pebbles
 Reaction: pH 5.6 to 7.3

E2 horizon

Hue: 10YR or 2.5Y
 Value: 6 or 7 dry, 4 or 5 moist
 Chroma: 1, 2, or 3
 Texture: coarse sandy loam or loamy coarse sand
 Clay content: 5 to 15 percent
 Rock fragments: 0 to 35 percent—0 to 10 percent cobbles, stones, or boulders; 5 to 35 percent angular pebbles
 Reaction: pH 5.6 to 7.3

E and Bt horizon

Hue: E part 10YR or 2.5Y, Bt part 10YR or 2.5Y
 Value: E part 6 or 7, B part 4 or 5 dry; E part 4, 5, or 6, B part 3 or 4 moist
 Chroma: E part 2 or 3, B part 2 or 3
 Clay content, mixed: 5 to 18 percent, lamellae has less than 3 percent clay increase
 Texture: sandy loam or coarse sandy loam
 Rock fragments: 0 to 35 percent—0 to 10 percent cobbles; 10 to 35 percent angular pebbles
 Reaction: pH 5.6 to 7.3

2C horizon

Hue: 10YR or 2.5Y
 Value: 5, 6, or 7 dry, 4 or 5 moist
 Chroma: 1, 2, 3, or 4
 Texture: coarse sandy loam, coarse sand, loamy coarse sand, sand, or loamy sand

Clay content: 0 to 5 percent
 Rock fragments: 15 to 60 percent—10 to 25 percent cobbles and stones, 10 to 45 percent angular pebbles
 Reaction: pH 5.6 to 7.3

Amor Series

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Hills

Parent material: Residuum from interbedded sandstone and shale

Slope range: 15 to 45 percent

Annual precipitation: 17 to 19 inches

Annual air temperature: 41 to 44 degrees F

Frost-free period: 90 to 110 days

Taxonomic Class: Fine-loamy, mixed Typic Haploborolls

Typical Pedon

Amor loam, in an area of Shambo-Amor-Cabba loams, 15 to 45 percent slopes, in rangeland, 1,100 feet west and 1,800 feet north of the southeast corner of sec. 17, T. 21 N., R. 9 E.

A—0 to 5 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; strong fine and medium granular structure; soft, very friable, slightly sticky and slightly plastic; many fine and very fine and few medium roots; slightly effervescent; neutral; clear wavy boundary.

Bw—5 to 14 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; strong fine and medium subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; many fine and very fine and few medium roots; many very fine tubular pores; strongly effervescent; mildly alkaline; clear wavy boundary.

Bk1—14 to 25 inches; light brownish gray (10YR 6/2) loam, grayish brown (10YR 5/2) moist; moderate fine and medium subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; common fine and very fine and few medium roots; many fine and very fine tubular pores; common fine seams and masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk2—25 to 34 inches; light brownish gray (10YR 6/2) loam, grayish brown (10YR 5/2) moist; weak fine and medium subangular blocky structure; hard,

very friable, slightly sticky and slightly plastic; common fine and very fine and few medium roots; many very fine tubular pores; many fine seams and masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Cr—34 to 60 inches; light brownish gray (10YR 6/2) and grayish brown (10YR 5/2) interbedded sandstone and shale, grayish brown (10YR 5/2) and dark grayish brown (10YR 4/2) moist; few fine roots in upper part; strongly effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 15 inches

Depth to bedrock: 20 to 40 inches

Depth to the Bk horizon: 10 to 20 inches

A horizon

Value: 3, 4, or 5 dry; 2 or 3 moist

Chroma: 2 or 3

Clay content: 15 to 27 percent

Rock fragments: 0 to 15 percent pebbles

Reaction: pH 6.6 to 7.3

Bw horizon

Hue: 10YR or 2.5Y

Value: 4, 5, 6, or 7 dry, 3, 4, 5, or 6 moist

Chroma: 2, 3, or 4

Texture: loam, sandy clay loam, clay loam, or fine sandy loam

Clay content: 18 to 35 percent

Reaction: pH 6.6 to 8.4

Bk horizons

Hue: 10YR or 2.5Y

Value: 5, 6, 7, or 8 dry; 4, 5, or 6 moist

Chroma: 2, 3, or 4

Texture: loam, fine sandy loam, silt loam, or clay loam

Clay content: 18 to 35 percent

Reaction: pH 6.6 to 8.4

Arrowpeak Series

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Permeability: Moderately rapid (2.0 to 6.0 inches/hour)

Landform: Mountains

Parent material: Residuum from igneous rock

Slope range: 25 to 70 percent

Annual precipitation: 20 to 28 inches

Annual air temperature: 38 to 42 degrees F

Frost-free period: 50 to 70 days

Taxonomic Class: Loamy-skeletal, mixed Lithic Cryoborolls

Typical Pedon

Arrowpeak very cobbly loam, in an area of Libeg-Arrowpeak-Elkner complex, 25 to 70 percent slopes, in rangeland, 700 feet south and 200 feet west of the northeast corner of sec. 7, T. 20 N., R. 9 E.

A—0 to 8 inches; dark grayish brown (10YR 4/2) very cobbly loam, very dark grayish brown (10YR 3/2) moist; strong fine and medium granular structure; soft, very friable, slightly sticky and slightly plastic; many fine and very fine and few medium roots; 20 percent pebbles and 30 percent cobbles, few surface stones; neutral; clear wavy boundary.

Bw—8 to 17 inches; brown (10YR 5/3) extremely cobbly loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine and few medium roots; many very fine tubular and irregular pores; 40 percent pebbles and 30 percent cobbles; neutral; clear wavy boundary.

R—17 inches; hard, fractured igneous bedrock.

Range in Characteristics

Mollic epipedon thickness: 7 to 20 inches

Content of clay in the control section: 10 to 20 percent

Rock fragments in the control section: 50 to 80 percent

Depth to bedrock: 10 to 20 inches

A horizon

Value: 3 or 4 dry, 2 or 3 moist

Clay content: 10 to 20 percent

Rock fragments: 35 to 60 percent—20 to 25 percent pebbles or channers, 15 to 30 percent cobbles, 0 to 5 percent stones

Reaction: pH 6.1 to 7.3

Bw horizon

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2 or 3

Texture: loam or sandy loam

Clay content: 10 to 20 percent

Rock fragments: 50 to 80 percent—25 to 30 percent pebbles or channers, 45 percent cobbles, 0 to 5 percent stones

Reaction: pH 6.1 to 7.3

Assinniboine Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour) to 16 inches; below this depth moderately rapid (2.0 to 6.0 inches/hour)

Landform: Alluvial fans, stream terraces, small drainageways

Parent material: Glaciofluvial deposits, eolian deposits, alluvium

Slope range: 0 to 4 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Fine-loamy, mixed Aridic Argiborolls

Typical Pedon

Assinniboine fine sandy loam, 0 to 4 percent slopes, in cropland, 1,600 feet south and 2,600 feet west of the northeast corner of sec. 17, T. 26 N., R. 12 E.

Ap—0 to 6 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium granular structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; neutral; abrupt smooth boundary.

Bt1—6 to 10 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine tubular pores; few faint clay films on faces of peds; neutral; clear wavy boundary.

Bt2—10 to 16 inches; brown (10YR 5/3) sandy clay loam, dark brown (10YR 4/3) moist; strong medium prismatic structure parting to moderate fine and medium subangular blocky; hard, very friable, sticky and plastic; common very fine and fine roots; many very fine tubular pores; many faint clay films on faces of peds; neutral; clear wavy boundary.

Bk1—16 to 32 inches; light brownish gray (2.5Y 6/2) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure parting to weak fine and medium subangular blocky; slightly

hard, very friable, nonsticky and nonplastic; common very fine roots; many very fine tubular pores; few fine masses of lime; slightly effervescent; mildly alkaline; gradual wavy boundary.

Bk2—32 to 48 inches; light gray (2.5Y 7/2) fine sandy loam, grayish brown (2.5Y 5/2) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; many very fine tubular pores; many fine and medium masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bck—48 to 60 inches; light yellowish brown (2.5Y 6/4) loamy fine sand, light olive brown (2.5Y 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine tubular and irregular pores; few small lime coated pebbles; disseminated lime; strongly effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 12 inches

Content of clay in the control section: 18 to 27 percent

Depth to the Bk horizon: 14 to 20 inches

Ap horizon

Hue: 10YR or 2.5Y

Chroma: 2 or 3

Texture: loam or fine sandy loam

Clay content: 5 to 25 percent

Rock fragments: 0 to 25 percent pebbles

Reaction: pH 6.1 to 7.8

Bt horizons

Hue: 10YR or 2.5Y

Value: 4, 5, or 6 dry; 3, 4, or 5 moist

Chroma: 2, 3, or 4

Texture: sandy clay loam or fine sandy loam

Clay content: 18 to 30 percent

Rock fragments: 0 to 15 percent pebbles

Reaction: pH 6.6 to 7.8

Bk horizons

Hue: 2.5Y or 10YR

Value: 5, 6, 7, or 8 dry; 4, 5, or 6 moist

Chroma: 2, 3, or 4

Texture: sandy loam, fine sandy loam, or sandy clay loam

Clay content: 10 to 27 percent

Rock fragments: 0 to 15 percent pebbles

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.4 to 8.4
Some pedons have a Btk horizon

*B*Ck horizon

Hue: 2.5Y or 10YR
Value: 5, 6, or 7 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Texture: fine sandy loam, sandy loam, loamy fine sand, or fine sand, or stratifications of these textures
Clay content: 0 to 15 percent
Rock fragments: 0 to 15 percent pebbles
Reaction: pH 7.4 to 8.4

35B—Assinniboine fine sandy loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans, stream terraces, and drainageways
Slope: 0 to 4 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Assinniboine and similar soils: 90 percent

Minor Components

Lihen and similar soils: 0 to 3 percent
Assinniboine loam: 0 to 3 percent
Evanston and similar soils: 0 to 2 percent
Kenilworth and similar soils: 0 to 2 percent

Major Component Description

Surface layer texture: Fine sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium or eolian material
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.7 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

39B—Assinniboine loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans, stream terraces, and drainageways
Slope: 0 to 4 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Assinniboine and similar soils: 85 percent

Minor Components

Assinniboine fine sandy loam: 0 to 5 percent
Cozberg and similar soils: 0 to 5 percent
Evanston and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciofluvial deposits
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.8 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Attewan Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour) to 27 inches; below this depth rapid (6.0 to 20.0 inches/hour)
Landform: Outwash plains
Parent material: Glacial outwash
Slope range: 0 to 4 percent
Annual precipitation: 11 to 14 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 105 to 125 days

Taxonomic Class: Fine-loamy over sandy or sandy-skeletal, mixed Aridic Argiborolls

Typical Pedon

Attewan loam, in an area of Attewan-Tinsley complex, 2 to 8 percent slopes, in rangeland, 2,300 feet north and 15 feet east of the southwest corner of sec. 36, T. 25 N., R. 10 E.

A—0 to 5 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; strong fine granular structure; soft, very friable, slightly sticky and slightly plastic; many fine roots and few medium roots; neutral; abrupt wavy boundary.

Bt1—5 to 12 inches; brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; hard, very friable, sticky and plastic; many fine roots and few medium roots; many very fine tubular pores; many faint clay films on faces of peds; mildly alkaline; clear wavy boundary.

Bt2—12 to 17; grayish brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) moist; moderate medium prismatic structure parting to strong medium subangular blocky; hard, very friable, sticky and plastic; few fine roots; many very fine tubular pores; common faint clay films on faces of peds; mildly alkaline; clear wavy boundary.

Bk—17 to 27 inches; light brownish gray (10YR 6/2) loam, grayish brown (10YR 5/2) moist; moderate fine and medium subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; common medium masses of lime; violently effervescent; moderately alkaline; clear wavy boundary.

2Ck—27 to 36 inches; light brownish gray (10YR 6/2) extremely gravelly loamy sand, brown (10YR 5/3) moist; single grain; loose, nonsticky and nonplastic; few fine roots; many fine irregular pores; 15 percent cobbles, 50 percent pebbles; lime coatings on undersides of rock fragments; disseminated lime; violently effervescent; moderately alkaline; clear wavy boundary.

2C—36 to 60 inches; light brownish gray and grayish brown (10YR 6/2 and 5/2) very gravelly coarse sand, brown (10YR 4/3) moist; single grain; loose,

nonsticky and nonplastic; many fine irregular pores; 5 percent cobbles, 50 percent pebbles; slightly effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 12 inches

Depth to the Bk horizon: 10 to 20 inches

Depth to the 2C horizon: 20 to 40 inches

A horizon

Hue: 10YR or 2.5Y

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 2 or 3

Clay content: 10 to 20 percent

Rock fragments: 0 to 50 percent—0 to 20 percent greater than 3 inch stones and cobbles, 0 to 30 percent less than 3-inch pebbles

Reaction: pH 6.1 to 7.8

Bt horizons

Hue: 10YR or 2.5Y

Value: 4, 5, or 6 dry; 3 or 4 moist

Chroma: 2 or 3

Texture: clay loam, sandy clay loam, or loam

Clay content: 20 to 35 percent

Rock fragments: 0 to 25 percent—0 to 5 percent greater than 3 inch stones and cobbles, 0 to 20 percent less than 3-inch pebbles

Reaction: pH 6.6 to 7.8

Bk horizon

Hue: 10YR or 2.5Y

Value: 5, 6, 7, or 8 dry; 4, 5, or 6 moist

Chroma: 2, 3, 4, or 6

Texture: loam, clay loam, silt loam, sandy clay loam, or sandy loam

Clay content: 15 to 30 percent

Rock fragments: 0 to 30 percent—0 to 5 percent stones and cobbles, 0 to 25 percent pebbles

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.4 to 8.4

2C horizons

Hue: 2.5Y or 10YR

Value: 4, 5, or 6 dry; 4 or 5 moist

Chroma: 2, 3, or 4

Texture: loamy sand, sand, loamy coarse sand, or coarse sand

Clay content: 0 to 10 percent

Rock fragments: 35 to 75 percent—0 to 15 percent stones and cobbles, 35 to 60 percent pebbles

Reaction: pH 7.4 to 8.4

27B—Attewan loam, 0 to 4 percent slopes**Setting***Landform:* Outwash plains*Slope:* 0 to 4 percent*Mean annual precipitation:* 11 to 14 inches*Frost-free period:* 105 to 125 days**Composition****Major Components**

Attewan and similar soils: 85 percent

Minor Components

Attewan sandy loam: 0 to 5 percent

Tinsley and similar soils: 0 to 5 percent

Evanston and similar soils: 0 to 5 percent

Major Component Description*Surface layer texture:* Loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Glacial outwash*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 5.0 inches**Management**

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

272C—Attewan-Tinsley complex, 2 to 8 percent slopes**Setting***Landform:*

* Attewan—Outwash plains

* Tinsley—Relict stream terraces

Position on landform:

* Attewan—Footslopes

* Tinsley—Backslopes and shoulders

Slope:

* Attewan—2 to 4 percent

* Tinsley—2 to 8 percent

Mean annual precipitation: 11 to 14 inches*Frost-free period:* 105 to 125 days**Composition****Major Components**

Attewan and similar soils: 55 percent

Tinsley and similar soils: 35 percent

Minor Components

Chinook and similar soils: 0 to 3 percent

Evanston and similar soils: 0 to 3 percent

Degrand and similar soils: 0 to 2 percent

Slopes more than 8 percent: 0 to 2 percent

Major Component Description**Attewan***Surface layer texture:* Loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Glacial outwash*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 5.0 inches**Tinsley***Surface layer texture:* Gravelly sandy loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Excessively drained*Dominant parent material:* Glacial outwash*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 1.4 inches**Management**

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

200—Badland**Composition****Major Components**

Badland: 90 percent

Minor Components

Cabbart and similar soils: 0 to 2 percent

Yawdim and similar soils: 0 to 2 percent



Figure 3. Typical area of Badland in the eastern part of the survey area.

Yamacall and similar soils: 0 to 2 percent
 Marvan and similar soils: 0 to 2 percent
 Weingart and similar soils: 0 to 1 percent
 Delpoint and similar soils: 0 to 1 percent

Major Component Description

Definition: Steep or very steep, barren land dissected by many intermittent drainage channels (fig. 3)

Management

For management information about this map unit see appropriate sections in Part II of this publication.

Barkof Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Permeability: Very slow (<0.06 inch/hour)

Landform: Hills

Parent material: Residuum from shale

Slope range: 8 to 45 percent

Annual precipitation: 14 to 19 inches

Annual air temperature: 41 to 45 degrees F

Frost-free period: 90 to 120 days

Taxonomic Class: Fine, montmorillonitic, frigid Leptic
 Udic Haplusterts

Typical Pedon

Barkof silty clay, in an area of Norbert-Barkof silty clays, 25 to 60 percent slopes, in rangeland, 2,400 feet east and 2,400 feet south of the northwest corner of sec. 33, T. 22 N., R. 9 E.

A—0 to 4 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; moderate medium granular structure; very hard, friable, very

sticky and very plastic; common very fine and fine roots; mildly alkaline; clear smooth boundary.

Bss—4 to 14 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; weak medium prismatic structure parting to moderate medium subangular blocky; extremely hard, firm, very sticky and very plastic; common very fine and fine roots; common very fine tubular pores; few intersecting slickensides; strongly effervescent; moderately alkaline; clear wavy boundary.

Bkssy—14 to 24 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure; extremely hard, very firm, very sticky and very plastic; few very fine and fine roots; common very fine tubular pores; few intersecting slickensides; common fine and medium masses of lime and gypsum; strongly effervescent; moderately alkaline; clear wavy boundary.

Cr—24 to 60 inches; grayish brown (2.5Y 5/2) shale, dark grayish brown (2.5Y 4/2) moist; few fine masses of gypsum; slightly effervescent; mildly alkaline.

Range in Characteristics

Content of clay in the control section: 45 to 60 percent
Depth to the Cr horizon: 20 to 40 inches

A horizon

Hue: 5Y, 2.5Y, or 10YR
Value: 4 or 5 dry, 4 or 5 moist
Chroma: 2, 3, or 4
Clay content: 40 to 55 percent
Rock fragments: 0 to 30 percent—0 to 15 percent greater than 3 inches, 0 to 15 percent pebbles
Electrical conductivity: 0 to 2 mmhos/cm
Reaction: pH 7.4 to 8.4

Bss horizon

Hue: 5Y, 2.5Y, or 10YR
Value: 4, 5, or 6 dry; 3, 4, or 5 moist
Chroma: 2, 3, or 4
Texture: clay or silty clay
Clay content: 45 to 60 percent
Electrical conductivity: 0 to 4 mmhos/cm
Reaction: pH 7.9 to 9.0
Some pedons have a Bkssy horizon

Bkssy horizon

Hue: 5Y, 2.5Y, or 10YR
Value: 4, 5, or 6 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Texture: clay or silty clay

Clay content: 45 to 60 percent
Electrical conductivity: 2 to 4 mmhos/cm
Reaction: pH 7.9 to 9.0

Bascovy Series

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Permeability: Very slow (<0.06 inch/hour)

Landform: Sedimentary plains, hills

Parent material: Residuum from shale

Slope range: 2 to 45 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Fine, montmorillonitic, frigid Leptic Udic Haplusterts

Typical Pedon

Bascovy silty clay, in an area of Bascovy-Neldore silty clays, 8 to 25 percent slopes, in rangeland, 500 feet south and 900 feet west of the northeast corner of sec. 24, T. 24 N., R. 12 E.

A—0 to 4 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; strong fine and medium granular structure; hard, friable, sticky and plastic; common very fine and fine roots; neutral; clear smooth boundary.

Bss—4 to 15 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; moderate medium subangular blocky structure; extremely hard, firm, very sticky and very plastic; many very fine and fine roots; few very fine tubular pores; few intersecting slickensides; neutral; clear wavy boundary.

By—15 to 29 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; massive; extremely hard, firm, very sticky and very plastic; many very fine and fine roots; few very fine tubular pores; few fine and medium masses of gypsum; moderately acid; clear wavy boundary.

Cr—29 to 60 inches; grayish brown (2.5Y 5/2) shale, dark grayish brown (2.5Y 4/2) moist; few fine roots in fractures in the upper part, strongly acid.

Range in Characteristics

Content of clay in the control section: 45 to 60 percent
Depth to the Cr horizon: 20 to 40 inches

A horizon

Hue: 10YR, 2.5Y, or 5Y
 Value: 5, 6, or 7 dry; 3, 4, or 5 moist
 Chroma: 1, 2, or 3
 Clay content: 40 to 60 percent
 Electrical conductivity: 2 to 4 mmhos/cm
 Reaction: pH 6.6 to 7.8

Bss horizon

Hue: 10YR, 2.5Y, or 5Y
 Value: 5, 6, or 7 dry; 4 or 5 moist
 Chroma: 1, 2, or 3
 Texture: clay or silty clay
 Clay content: 45 to 60 percent
 Electrical conductivity: 2 to 4 mmhos/cm
 Reaction: pH 6.1 to 7.8

By horizon

Hue: 10YR, 2.5Y, or 5Y
 Value: 5 or 6 dry, 4 or 5 moist
 Chroma: 1, 2, or 3
 Texture: clay or silty clay
 Clay content: 45 to 60 percent
 Gypsum content: 1 to 5 percent
 Electrical conductivity: 2 to 8 mmhos/cm
 Reaction: pH 5.1 to 7.3

252C—Bascovy-Marvan silty clays, 2 to 8 percent slopes

Setting

Landform:

- * Bascovy—Sedimentary plains
- * Marvan—Sedimentary plains

Position on landform:

- * Bascovy—Backslopes and shoulders
- * Marvan—Footslopes

Slope:

- * Bascovy—2 to 8 percent
- * Marvan—2 to 4 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Bascovy and similar soils: 50 percent
 Marvan and similar soils: 35 percent

Minor Components

Neldore and similar soils: 0 to 6 percent
 Vanda and similar soils: 0 to 3 percent

Kobase and similar soils: 0 to 3 percent
 Mego not and similar soils: 0 to 3 percent

Major Component Description

Bascovy

Surface layer texture: Silty clay
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Shale residuum
Native plant cover type: Rangeland
Flooding: None
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 4.4 inches

Marvan

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.0 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

251C—Bascovy-Neldore silty clays, 2 to 8 percent slopes

Setting

Landform:

- * Bascovy—Sedimentary plains
- * Neldore—Sedimentary plains

Position on landform:

- * Bascovy—Footslopes
- * Neldore—Backslopes and shoulders

Slope:

- * Bascovy—2 to 8 percent
- * Neldore—2 to 8 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Bascovy and similar soils: 55 percent
 Neldore and similar soils: 35 percent

Minor Components

Weingart and similar soils: 0 to 5 percent
 Marvan and similar soils: 0 to 5 percent

Major Component Description**Bascovy**

Surface layer texture: Silty clay
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Shale residuum
Native plant cover type: Rangeland
Flooding: None
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 4.4 inches

Neldore

Surface layer texture: Silty clay
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.2 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

251E—Bascovy-Neldore silty clays, 8 to 25 percent slopes**Setting***Landform:*

- * Bascovy—Hills
- * Neldore—Hills

Position on landform:

- * Bascovy—Backslopes and footslopes
- * Neldore—Backslopes and shoulders

Slope:

- * Bascovy—8 to 25 percent
- * Neldore—8 to 25 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition**Major Components**

Bascovy and similar soils: 50 percent
 Neldore and similar soils: 35 percent

Minor Components

Marvan and similar soils: 0 to 5 percent
 Areas of rock outcrop: 0 to 3 percent
 Calcareous soils: 0 to 3 percent
 Weingart and similar soils: 0 to 2 percent
 Megonot and similar soils: 0 to 2 percent

Major Component Description**Bascovy**

Surface layer texture: Silty clay
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Shale residuum
Native plant cover type: Rangeland
Flooding: None
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 4.4 inches

Neldore

Surface layer texture: Silty clay
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.2 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Bearpaw Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Till plains, hills
Parent material: Glacial till
Slope range: 0 to 15 percent
Annual precipitation: 14 to 17 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 100 to 120 days

Taxonomic Class: Fine, montmorillonitic Typic Argiborolls

Typical Pedon

Bearpaw clay loam, 0 to 4 percent slopes, in cropland, 700 feet south and 600 feet west of the northeast corner of sec. 34, T. 22 N., R. 7 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; strong fine granular structure; slightly hard, very friable, sticky and plastic; many very fine and fine roots; neutral; abrupt smooth boundary.

Bt1—6 to 12 inches: brown (10YR 5/3) clay, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to strong fine subangular blocky; hard, firm, very sticky and very plastic; many very fine and fine roots; many very fine tubular pores; many distinct clay films on faces of peds; neutral; clear wavy boundary.

Bt2—12 to 16 inches; brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; moderate medium prismatic structure parting to strong fine subangular blocky; hard, firm, sticky and plastic; many very fine and fine roots; many very fine tubular pores; many distinct clay films on faces of peds; neutral; clear wavy boundary.

Bk1—16 to 22 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium prismatic structure parting to strong fine subangular blocky; hard, friable, sticky and plastic; common very fine and fine roots; many very fine pores; few fine masses of lime; strongly effervescent; moderately alkaline; clear wavy boundary.

Bk2—22 to 34 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure parting to weak medium subangular blocky; hard, friable, sticky and plastic; common very fine tubular pores; common fine and medium masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

BCky—34 to 60 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, sticky and plastic; few very

fine tubular pores; few lignite and shale chips; few pebbles; few medium masses of gypsum below 48 inches; few fine masses of lime; strongly effervescent; slightly effervescent below 48 inches; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 12 inches

Content of clay in the control section: 35 to 50 percent

Depth to the Bk horizon: 10 to 20 inches

Ap horizon

Value: 3, 4, or 5 dry; 2 or 3 moist

Chroma: 2 or 3

Clay content: 27 to 35 percent

Rock fragments: 0 to 20 percent—0 to 5 percent cobbles, 0 to 15 percent pebbles

Reaction: pH 6.1 to 7.8

Bt1 horizon

Value: 4 or 5 dry, 3 moist

Chroma: 2 or 3

Clay content: 35 to 50 percent

Rock fragments: 0 to 20 percent—0 to 5 percent cobbles, 0 to 15 percent pebbles

Reaction: pH 6.6 to 7.8

Bt2 horizon

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2 or 3

Texture: clay loam or clay

Clay content: 35 to 50 percent

Rock fragments: 0 to 20 percent—0 to 5 percent cobbles, 0 to 15 percent pebbles

Reaction: pH 6.6 to 7.8

Bk horizons

Hue: 2.5Y or 5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 or 3

Texture: clay loam, silty clay loam, or clay

Clay content: 35 to 45 percent

Rock fragments: 0 to 20 percent—0 to 5 percent cobbles, 0 to 15 percent pebbles

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.4 to 8.4

BCky horizon

Hue: 2.5Y or 5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 or 3

Texture: clay loam, silty clay loam, or clay

Clay content: 30 to 45 percent

Rock fragments: 0 to 20 percent—0 to 5 percent
cobbles, 0 to 15 percent pebbles
Bulk density: 1.6 to 1.8 grams/cc
Gypsum Content: 0 to 2 percent
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.4 to 8.4

67B—Bearpaw clay loam, 0 to 4 percent slopes

Setting

Landform: Till plains
Slope: 0 to 4 percent
Mean annual precipitation: 14 to 17 inches
Frost-free period: 100 to 120 days

Composition

Major Components

Bearpaw and similar soils: 85 percent

Minor Components

Vida and similar soils: 0 to 10 percent
Waltham and similar soils: 0 to 3 percent
Nishon and similar soils: 0 to 1 percent
Zahill and similar soils: 0 to 1 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.1 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

67C—Bearpaw clay loam, 4 to 8 percent slopes

Setting

Landform: Till plains
Slope: 4 to 8 percent

Mean annual precipitation: 14 to 17 inches
Frost-free period: 100 to 120 days

Composition

Major Components

Bearpaw and similar soils: 85 percent

Minor Components

Vida and similar soils: 0 to 9 percent
Waltham and similar soils: 0 to 2 percent
Slopes less than 4 percent: 0 to 2 percent
Nishon and similar soils: 0 to 1 percent
Zahill and similar soils: 0 to 1 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.1 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

673A—Bearpaw-Daglum complex, 0 to 2 percent slopes

Setting

Landform:
* Bearpaw—Till plains
* Daglum—Till plains
Position on landform:
* Bearpaw—Microhighs
* Daglum—Microlows

Slope:
* Bearpaw—0 to 2 percent
* Daglum—0 to 2 percent

Mean annual precipitation: 14 to 17 inches
Frost-free period: 100 to 120 days

Composition

Major Components

Bearpaw and similar soils: 55 percent
Daglum and similar soils: 30 percent

Minor Components

Gerber and similar soils: 0 to 10 percent
 Vida and similar soils: 0 to 4 percent
 Nishon and similar soils: 0 to 1 percent

Major Component Description**Bearpaw**

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.1 inches

Daglum

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 7.3 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

671B—Bearpaw-Vida clay loams, 0 to 4 percent slopes**Setting***Landform:*

- * Bearpaw—Till plains
- * Vida—Till plains

Position on landform:

- * Bearpaw—Footslopes and toeslopes
- * Vida—Backslopes and shoulders

Slope:

- * Bearpaw—0 to 4 percent
- * Vida—0 to 4 percent

Mean annual precipitation: 14 to 17 inches

Frost-free period: 100 to 120 days

Composition**Major Components**

Bearpaw and similar soils: 55 percent
 Vida and similar soils: 30 percent

Minor Components

Zahill and similar soils: 0 to 6 percent
 Gerber and similar soils: 0 to 5 percent
 Waltham and similar soils: 0 to 3 percent
 Nishon and similar soils: 0 to 1 percent

Major Component Description**Bearpaw**

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.1 inches

Vida

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.6 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

671C—Bearpaw-Vida clay loams, 4 to 8 percent slopes**Setting***Landform:*

- * Bearpaw—Till plains
- * Vida—Till plains

Position on landform:

- * Bearpaw—Footslopes
- * Vida—Backslopes and shoulders

Slope:

* Bearpaw—4 to 8 percent

* Vida—4 to 8 percent

Mean annual precipitation: 14 to 17 inches*Frost-free period:* 100 to 120 days**Composition****Major Components**

Bearpaw and similar soils: 50 percent

Vida and similar soils: 35 percent

Minor Components

Zahill and similar soils: 0 to 6 percent

Gerber and similar soils: 0 to 5 percent

Waltham and similar soils: 0 to 3 percent

Nishon and similar soils: 0 to 1 percent

Major Component Description**Bearpaw***Surface layer texture:* Clay loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Till*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 9.1 inches**Vida***Surface layer texture:* Clay loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Till*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 9.6 inches**Management**

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

674B—Bearpaw-Waltham clay loams, 0 to 4 percent slopes**Setting***Landform:*

* Bearpaw—Till plains

* Waltham—Till plains

Position on landform:

* Bearpaw—Microhighs

* Waltham—Microlows

Slope:

* Bearpaw—0 to 4 percent

* Waltham—0 to 4 percent

Mean annual precipitation: 14 to 17 inches*Frost-free period:* 100 to 120 days**Composition****Major Components**

Bearpaw and similar soils: 55 percent

Waltham and similar soils: 30 percent

Minor Components

Vida and similar soils: 0 to 6 percent

Strongly saline/sodic soils: 0 to 5 percent

Zahill and similar soils: 0 to 3 percent

Nishon and similar soils: 0 to 1 percent

Major Component Description**Bearpaw***Surface layer texture:* Clay loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Till*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 9.1 inches**Waltham***Surface layer texture:* Clay loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Till*Native plant cover type:* Rangeland*Flooding:* None*Salt affected:* Saline within 30 inches*Sodium affected:* Sodic within 30 inches*Available water capacity:* Mainly 7.8 inches**Management**

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Beaverton Series*Depth class:* Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour) to 15 inches; below this depth rapid (6.0 to 20.0 inches/hour)

Landform: Relict stream terraces

Parent material: Alluvium

Slope range: 0 to 8 percent

Annual precipitation: 14 to 17 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 100 to 120 days

Taxonomic Class: Loamy-skeletal over sandy or sandy-skeletal, mixed Typic Argiborolls

Typical Pedon

Beaverton very cobbly loam, in an area of Sweetgrass-Beaverton complex, 2 to 8 percent slopes, in rangeland, 800 feet east and 600 feet north of the southwest corner of sec. 36, T. 22 N., R. 9 E.

A—0 to 4 inches; dark grayish brown (10YR 4/2) very cobbly loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine roots and few medium roots; 25 percent cobbles, 15 percent pebbles; neutral; clear smooth boundary.

Bt1—4 to 10 inches; brown (10YR 4/3) very gravelly clay loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; hard, friable, sticky and plastic; many very fine and fine roots; common very fine and fine tubular and irregular pores; many faint clay films on faces of peds; 10 percent cobbles, 40 percent pebbles; neutral; clear wavy boundary.

Bt2—10 to 15 inches; brown (10YR 5/3) very gravelly sandy clay loam, dark brown (10YR 4/3) moist; moderate fine subangular blocky structure; very hard, friable, sticky and plastic; many very fine and fine roots; common very fine and fine tubular and irregular pores; common faint clay films on faces of peds; 10 percent cobbles, 45 percent pebbles; neutral; clear wavy boundary.

2C—15 to 60 inches pale brown (10YR 6/3) extremely gravelly loamy sand, brown (10YR 5/3) moist; single grain; loose, nonsticky and nonplastic; few medium roots in upper part; 10 percent cobbles, 60 percent pebbles; slightly effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 14 inches and may include all or part of the Bt horizons

Content of clay in the control section: 25 to 35 percent

Rock fragments in the control section: 35 to 60 percent

Depth to the 2C horizon: 10 to 20 inches

A horizon

Hue: 2.5Y, 10YR, or 7.5YR

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 2 or 3

Clay content: 20 to 27 percent

Rock fragments: 5 to 60 percent—0 to 5 percent stones, 0 to 25 percent cobbles, 5 to 40 percent pebbles

Reaction: pH 6.6 to 7.8

Bt horizons

Hue: 2.5Y, 10YR, or 7.5YR

Value: 4 or 5 dry; 2, 3, or 4 moist

Chroma: 2 or 3

Texture: clay loam or sandy clay loam

Clay content: 25 to 35 percent

Rock fragments: 35 to 60 percent—0 to 5 percent stones, 0 to 30 percent cobbles, 15 to 45 percent pebbles

Reaction: pH 6.6 to 7.8

2C horizon

Hue: 2.5Y, 10YR, or 7.5YR

Value: 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 2, 3, or 4

Texture: loamy sand or sand

Clay content: 0 to 10 percent

Rock fragments: 35 to 80 percent—0 to 10 percent stones, 0 to 35 percent cobbles, 15 to 60 percent pebbles

Calcium carbonate equivalent: 3 to 15 percent

Reaction: pH 7.4 to 8.4

12C—Beaverton complex, 2 to 8 percent slopes

Setting

Landform:

* Beaverton—Relict stream terraces

* Beaverton—Relict stream terraces

Position on landform:

* Beaverton—Treads

* Beaverton—Treads

Slope:

* Beaverton—2 to 8 percent

* Beaverton—2 to 8 percent

Mean annual precipitation: 14 to 17 inches

Frost-free period: 100 to 120 days

Composition

Major Components

Beaverton and similar soils: 45 percent
Beaverton and similar soils: 40 percent

Minor Components

Beaverton stony loam: 0 to 5 percent
Sweetgrass and similar soils: 0 to 3 percent
Turner and similar soils: 0 to 3 percent
Very gravelly sand surfaces: 0 to 2 percent
Slopes more than 8 percent: 0 to 2 percent

Major Component Description

Beaverton

Surface layer texture: Very cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.9 inches

Beaverton

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Belain Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour) to 18 inches; below this depth moderately rapid (2.0 to 6.0 inches/hour)
Landform: Hills, bedrock floored plains
Parent material: Residuum from igneous rocks
Slope range: 2 to 60 percent

Annual precipitation: 15 to 19 inches

Annual air temperature: 41 to 44 degrees F

Frost-free period: 90 to 110 days

Taxonomic Class: Coarse-loamy, mixed Typic Haploborolls

Typical Pedon

Belain loam, in an area of Hedoes-Belain loams, 8 to 25 percent slopes, in hayland, 2,600 feet west and 2,400 feet south of the northeast corner of sec. 24, T. 27 N., R. 15 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; strong fine granular structure; soft, very friable, slightly sticky and nonplastic; many fine and very fine roots; neutral; abrupt smooth boundary.

Bw1—6 to 13 inches; dark brown (10YR 4/3) loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure parting to weak medium subangular blocky; slightly hard, very friable, slightly sticky and nonplastic; common fine and very fine roots; many very fine tubular pores; neutral; clear wavy boundary.

Bw2—13 to 18 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 4/3) moist; weak medium prismatic structure parting to weak fine and medium subangular blocky; slightly hard, very friable, nonsticky and nonplastic; common fine and very fine roots; many very fine tubular pores; neutral; gradual wavy boundary.

Bk—18 to 26 inches; grayish brown (10YR 5/2) gravelly sandy loam, dark grayish brown (10YR 4/2) moist; weak fine subangular structure; slightly hard, very friable, nonsticky and nonplastic; 20 percent pebbles; few fine masses of lime; slightly effervescent; mildly alkaline.

R—26 inches; dark basic igneous bedrock; weathered in upper 5 inches.

Range in Characteristics

Mollic epipedon thickness: 10 to 16 inches

Content of clay in the control section: 10 to 18 percent

Rock fragments in the control section: 15 to 35 percent

Depth to bedrock: 20 to 40 inches

A horizon

Hue: 7.5YR, 10YR, or 2.5Y

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 2 or 3

Texture: loam or sandy loam

Clay content: 5 to 20 percent

Rock fragments: 0 to 20 percent—0 to 10 percent
cobbles, 0 to 10 percent pebbles

Reaction: pH 6.1 to 7.8

Bw horizons

Hue: 7.5YR, 10YR, or 2.5Y

Value: 4, 5, or 6 dry; 3, 4, or 5 moist

Chroma: 2, 3, or 4

Clay content: 10 to 18 percent

Texture: sandy loam or loam

Rock fragments: 0 to 35 percent—0 to 5 percent
cobbles, 0 to 35 percent pebbles

Reaction: pH 6.6 to 8.4

Bk horizon

Hue: 7.5YR, 10YR, or 2.5Y

Value: 4, 5, or 6 dry; 3, 4, or 5 moist

Chroma: 2, 3, or 4

Texture: loam or sandy loam

Rock fragments: 15 to 45 percent—0 to 5 percent
cobbles, 15 to 40 percent pebbles

Lime coats or casts: few to common, faint to
prominent

Calcium carbonate equivalent: 1 to 10 percent

Reaction: pH 7.4 to 8.4

916C—Belain-Hedoes sandy loams, 2 to 8 percent slopes

Setting

Landform:

* Belain—Bedrock-floored plains

* Hedoes—Alluvial fans

Position on landform:

* Belain—Backslopes and shoulders

* Hedoes—Footslopes

Slope:

* Belain—2 to 8 percent

* Hedoes—2 to 8 percent

Mean annual precipitation: 15 to 19 inches

Frost-free period: 90 to 110 days

Composition

Major Components

Belain and similar soils: 55 percent

Hedoes and similar soils: 30 percent

Minor Components

Sandy soils shallow to bedrock: 0 to 7 percent

Perma and similar soils: 0 to 3 percent

Loamy sand surface layers: 0 to 3 percent

Areas of rock outcrop: 0 to 2 percent

Major Component Description

Belain

Surface layer texture: Sandy loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Igneous residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 2.9 inches

Hedoes

Surface layer texture: Sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 6.9 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

895F—Belain-Whitlash, moist-Hedoes complex, 15 to 60 percent slopes

Setting

Landform:

* Belain—Hills

* Whitlash—Hills

* Hedoes—Hills

Position on landform:

* Belain—Backslopes

* Whitlash—Shoulders and summits

* Hedoes—Footslopes

Slope:

* Belain—25 to 60 percent

* Whitlash—25 to 60 percent

* Hedoes—15 to 45 percent

Mean annual precipitation: 15 to 19 inches
Frost-free period: 90 to 110 days

Composition

Major Components

Belain and similar soils: 35 percent
 Whitlash and similar soils: 30 percent
 Hedoes and similar soils: 20 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent
 Perma and similar soils: 0 to 3 percent
 Belain soils, forested: 0 to 3 percent
 Hedoes soils, forested: 0 to 2 percent
 Soils very shallow to bedrock: 0 to 2 percent

Major Component Description

Belain

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Igneous residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.7 inches

Whitlash

Surface layer texture: Channery loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Igneous residuum
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 1.5 inches

Hedoes

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.2 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

911F—Belain-Whitlash-Hedoes complex, 15 to 45 percent slopes

Setting

Landform:

- * Belain—Hills
- * Whitlash—Hills
- * Hedoes—Hills

Position on landform:

- * Belain—Backslopes
- * Whitlash—Shoulders and summits
- * Hedoes—Footslopes

Slope:

- * Belain—15 to 45 percent
- * Whitlash—15 to 45 percent
- * Hedoes—15 to 45 percent

Mean annual precipitation: 15 to 19 inches
Frost-free period: 90 to 110 days

Composition

Major Components

Belain and similar soils: 45 percent
 Whitlash and similar soils: 25 percent
 Hedoes and similar soils: 20 percent

Minor Components

Areas of rock outcrop: 0 to 3 percent
 Perma and similar soils: 0 to 5 percent
 Slopes more than 45 percent: 0 to 2 percent

Major Component Description

Belain

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Igneous residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.7 inches

Whitlash

Surface layer texture: Channery loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Igneous residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.5 inches

Hedoes

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.2 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

896E—Belain-Whitlash-Rock outcrop complex, 8 to 25 percent slopes**Setting***Landform:*

- * Belain—Hills
- * Whitlash—Hills
- * Rock outcrop—Hills

Position on landform:

- * Belain—Backslopes and footslopes
- * Whitlash—Shoulders and summits
- * Rock outcrop—Shoulders and summits

Slope:

- * Belain—8 to 25 percent
- * Whitlash—8 to 25 percent

Mean annual precipitation: 15 to 19 inches

Frost-free period: 90 to 110 days

Composition**Major Components**

Belain and similar soils: 45 percent
 Whitlash and similar soils: 30 percent
 Rock outcrop: 15 percent

Minor Components

Perma and similar soils: 0 to 3 percent
 Slopes more than 25 percent: 0 to 3 percent
 Hedoes and similar soils: 0 to 2 percent
 Sandy loam surface layers: 0 to 2 percent

Major Component Description**Belain**

Surface layer texture: Loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Igneous residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 3.7 inches

Whitlash

Surface layer texture: Channery loam

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Dominant parent material: Igneous residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 1.5 inches

Rock outcrop

Definition: Exposures of igneous bedrock

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Benz Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Slow (0.06 to 0.2 inch/hour)

Landform: Alluvial fans

Parent material: Alluvium

Slope range: 2 to 15 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Fine-loamy, mixed (calcareous), frigid Aridic Ustorthents

Typical Pedon

Benz clay loam, in an area of Yamacall-Benz clay loams, 2 to 8 percent slopes, in rangeland, 2,300 feet west and 500 feet south of the northeast corner of sec. 16, T. 25 N., R. 17 E.

E—0 to 2 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure with a vesicular crust 1/2-inch thick; very hard, very friable, slightly sticky and slightly plastic; few fine and very fine roots;

common very fine vesicular and tubular pores; mildly alkaline; abrupt smooth boundary.

Bkn—2 to 4 inches; brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; moderate fine and medium prismatic structure parting to moderate medium subangular blocky; very hard, friable, sticky and plastic; few fine and very fine roots; common very fine tubular pores; few fine masses of lime; slightly effervescent; strongly alkaline; clear wavy boundary.

Bkny1—4 to 10 inches; brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; moderate fine prismatic structure parting to moderate medium subangular blocky; very hard, very friable, sticky and plastic; few fine and very fine roots; many very fine tubular pores; lime disseminated; few fine masses of gypsum; strongly effervescent; strongly alkaline; clear wavy boundary.

Bkny2—10 to 28 inches; light yellowish brown (2.5Y 6/4) loam, olive brown (2.5Y 4/4) moist; weak medium subangular blocky structure; very hard, very friable, slightly sticky and slightly plastic; roots present; many very fine tubular pores; common fine masses and threads of lime; few fine masses of gypsum; strongly effervescent; strongly alkaline; gradual wavy boundary.

Bkny3—28 to 41 inches; light yellowish brown (2.5Y 6/4) loam, olive brown (2.5Y 4/4) moist; weak medium subangular blocky structure; very hard, very friable, slightly sticky and slightly plastic; many very fine tubular pores; few fine masses of lime and gypsum; strongly effervescent; very strongly alkaline; clear wavy boundary.

Bkny4—41 to 60 inches; light yellowish brown (2.5Y 6/4) thick strata of fine sandy loam and silty clay loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, friable, sticky and plastic; many very fine tubular pores; few fine masses of lime and gypsum; violently effervescent; very strongly alkaline.

Range in Characteristics

Content of clay in the control section: 18 to 35 percent

E horizon

Hue: 2.5Y or 10YR

Value: 5, 6, or 7 dry; 3, 4, or 5 moist

Chroma: 2 or 3

Clay content: 18 to 27 percent

Electrical conductivity: 4 to 8 mmhos/cm

Sodium adsorption ratio: 4 to 13

Reaction: pH 7.4 to 9.0

Bkn and Bkny horizons

Hue: 5Y, 2.5Y, 10YR

Value: 5, 6, 7, or 8 dry; 4, 5, or 6 moist

Chroma: 2, 3, or 4

Texture: loam, clay loam, silt loam, or fine sandy loam

Clay content: 18 to 35 percent

Electrical conductivity: 8 to 16 mmhos/cm

Sodium adsorption ratio: 13 to 30

Calcium carbonate equivalent: 5 to 15 percent

Gypsum content: 2 to 5 percent

Reaction: pH 8.5 to 9.6

Bigzag Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Poorly drained

Permeability: Very slow (<0.06 inch/hour)

Landform: Flood plains

Parent material: Alluvium

Slope range: 0 to 2 percent

Annual precipitation: 11 to 17 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 100 to 125 days

Taxonomic Class: Fine, montmorillonitic (calcareous), frigid Typic Halaquepts

Typical Pedon

Bigzag silty clay, 0 to 2 percent slopes, in rangeland, 800 feet south and 600 feet east of the northwest corner of sec. 23, T. 21 N., R 10 E.

Anyz—0 to 4 inches; olive gray (5Y 4/2) silty clay, gray (5Y 5/1) dry, moderate fine subangular blocky structure; very hard, firm, very sticky and very plastic, common fine and very fine roots, few very fine tubular pores; few fine masses of gypsum and other salts; slightly effervescent; moderately alkaline; clear smooth boundary.

Bnyzg1—4 to 15 inches; olive gray (5Y 4/2) silty clay, gray (5Y 5/1) dry; few fine distinct light olive brown (2.5Y 5/4) dry mottles; weak medium subangular blocky structure; very hard, firm, very sticky and very plastic; few very fine roots; common very fine tubular pores; common fine seams and masses of gypsum and other salts; strongly effervescent; strongly alkaline; clear wavy boundary.

Bnyzg2—15 to 30 inches; dark gray (5Y 4/1) silty clay, gray (5Y 5/1) dry; common fine distinct grayish brown (2.5Y 5/2) dry mottles; weak medium subangular blocky structure; very hard, firm, very sticky and very plastic, few very fine roots, common very fine tubular pores; common fine seams and masses of gypsum and other salts; strongly effervescent; strongly alkaline; clear wavy boundary.

BCnyzg1—30 to 48 inches; olive gray (5Y 4/2) silty clay, olive gray (5Y 5/2) dry; many fine faint olive (5Y 5/3) dry mottles; massive; extremely hard, very firm, very sticky and very plastic; common very fine tubular pores; common fine seams and masses of gypsum and other salts; strongly effervescent; strongly alkaline; clear wavy boundary.

BCnyzg2—48 to 60 inches; dark gray (5Y 4/1) silty clay loam, light gray (5Y 6/1) dry; many fine faint olive (5Y 5/3) dry mottles; massive, very hard, firm, very sticky and very plastic; common very fine tubular pores; common fine seams and masses of gypsum and other salts; strongly effervescent; strongly alkaline.

Range in Characteristics

Content of clay in the control section: 35 to 60 percent

Depth to seasonal high water table: 18 to 36 inches during the period from December to June

Anyz horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5 or 6 dry, 3 or 4 moist

Chroma: 1 or 2

Texture: silty clay loam or silty clay

Clay content: 40 to 60 percent

Electrical conductivity: greater than 16 mmhos/cm

Sodium adsorption ratio: 13 to 20

Reaction: pH 7.9 to 9.0

Bnyzg1 horizon

Hue: 2.5Y or 5Y

Chroma: 1 or 2

Mottles: none to common (Hue: 2.5Y; Value: 5 dry, 4 moist; Chroma: 3 or 4)

Texture: silty clay loam or silty clay

Clay content: 35 to 60 percent

Electrical conductivity: greater than 16 mmhos/cm

Sodium adsorption ratio: 20 to 40

Reaction: pH 8.5 to 9.0

Bnyzg2 and BCnyzg horizons

Hue: 2.5Y or 5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 1 or 2

Mottles: common or many (Hue: 2.5Y or 5Y; Value: 5 dry, 4 moist; Chroma: 3 or 4)

Texture: silty clay loam or silty clay

Clay content: 35 to 60 percent

Electrical conductivity: greater than 16 mmhos/cm

Sodium adsorption ratio: 13 to 30, decreasing with depth

Reaction: pH 8.5 to 9.0

481A—Bigsag silty clay, 0 to 2 percent slopes

Setting

Landform: Flood plains

Slope: 0 to 2 percent

Mean annual precipitation: 11 to 17 inches

Frost-free period: 100 to 125 days

Composition

Major Components

Bigsag and similar soils: 90 percent

Minor Components

Somewhat poorly drained soils: 0 to 5 percent

Very poorly drained soils: 0 to 3 percent

Moderately saline soils: 0 to 2 percent

Major Component Description

Surface layer texture: Silty clay

Depth class: Very deep (more than 60 inches)

Drainage class: Poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: Rare

Water table: Apparent

Salt affected: Saline within 30 inches

Sodium affected: Sodic within 30 inches

Available water capacity: Mainly 5.1 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Big Sandy Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Poorly drained

Permeability: Moderately slow (0.2 to 0.6 inch/hour) to 32 inches; below this depth slow (0.06 to 0.2 inch/hour)

Landform: Flood plains

Parent material: Alluvium

Slope range: 0 to 2 percent

Annual precipitation: 11 to 17 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 100 to 125 days

Taxonomic Class: Fine-loamy, mixed (calcareous), frigid Typic Fluvaquents

Typical Pedon

Big Sandy loam, 0 to 1 percent slopes, in rangeland, 1,600 feet east and 50 feet south of the northwest corner of sec. 17, T. 28 N., R. 13 E.

- A—0 to 3 inches; very dark grayish brown (2.5Y 3/2) loam, grayish brown (2.5Y 5/2) dry; moderate fine subangular blocky structure parting to strong fine and medium granular; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine and few medium roots; slightly effervescent; moderately alkaline; clear smooth boundary.
- C—3 to 11 inches; dark grayish brown (2.5Y 4/2) loam consisting of strata of silty clay loam and fine sandy loam, light brownish gray (2.5Y 6/2) dry; few fine faint olive brown (2.5Y 4/4) mottles; weak medium prismatic structure; hard, very friable to firm, sticky and plastic; many fine and very fine and few medium roots; many very fine and few fine tubular pores; strongly effervescent; moderately alkaline; clear smooth boundary.
- Cg1—11 to 32 inches; olive gray (5Y 4/2) loam consisting of strata of silt loam, silty clay loam and fine sandy loam; gray and light olive gray (5Y 6/1 and 6/2) dry; common fine prominent olive brown (2.5Y 4/4) mottles; massive; hard, very friable to firm, sticky and plastic; common fine and very fine roots; common very fine tubular pores; few fine masses of lime; few fine masses of gypsum and other salts in silty clay loam strata; strongly effervescent; strongly alkaline; clear wavy boundary.
- Cg2—32 to 60 inches; dark gray and olive gray (5Y 4/1 and 4/2) clay loam consisting of strata of loam,

silty clay loam, fine sand and clay, light gray and gray (5Y 6/1 and 5/1) dry; common fine prominent olive brown (2.5Y 4/4) mottles; massive; hard, firm, sticky and plastic; few very fine roots; common very fine tubular pores; few fine masses of gypsum and other salts; strongly effervescent; strongly alkaline.

Range in Characteristics

Content of clay in the control section: 18 to 35 percent

Depth to seasonal high water table: 12 to 24 inches during the period from December to June

Soil phases: Saline

A horizon

Hue: 2.5Y or 10YR

Value: 3 or 4 moist

Chroma: 1 or 2

Mottles: none to few (Hue: 2.5Y; Value: 5 or 6 dry)

Clay content: 15 to 27 percent

Electrical conductivity: 2 to 25 mmhos/cm; saline phase 16 to 25 mmhos/cm

Reaction: pH 7.4 to 9.0

When mixed to 7 inches the epipedon has moist value of 4

C horizon

Hue: 2.5Y or 10YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 1 or 2

Mottles: none or few (Hue: 2.5Y; Value 5 or 6 dry)

Texture: loam or silty clay loam consisting of strata of silt loam, clay loam, or fine sandy loam

Clay content: 18 to 35 percent

Electrical conductivity: 2 to 25 mmhos/cm, saline phase 16 to 25 mmhos/cm

Reaction: pH 7.9 to 9.0

Cg1 horizon

Hue: 5Y or 2.5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 1 or 2

Mottles: common or many (Hue: 2.5Y or 10YR;

Value: 5 or 6 dry, 4 or 5 moist; Chroma: 4 or 6)

Texture: loam or silty clay loam consisting of strata of silt loam, clay loam, or fine sandy loam

Clay content: 18 to 35 percent

Electrical conductivity: 4 to 25 mmhos/cm, saline phase 16 to 25 mmhos/cm

Reaction: pH 8.5 to 9.0

Cg2 horizon

Hue: 5Y or 2.5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 1 or 2

Mottles: common or many (Hue: 2.5Y or 10YR; Value: 5 or 6 dry, 4 or 5 moist; Chroma: 4 or 6)
 Texture: silt loam, silty clay loam, or clay loam consisting of strata of silt loam, fine sandy loam, fine sand, loamy sand, or clay
 Clay content: 15 to 35 percent
 Electrical conductivity: 8 to 25 mmhos/cm; saline phase 16 to 25 mmhos/cm
 Reaction: pH 8.5 to 9.0

160A—Bigsandy loam, 0 to 1 percent slopes

Setting

Landform: Flood plains
Slope: 0 to 1 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Bigsandy and similar soils: 90 percent

Minor Components

Bigsandy silty clay loam: 0 to 5 percent
 Strongly saline soils: 0 to 3 percent
 Somewhat poorly drained soils: 0 to 2 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Poorly drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Water table: Apparent
Available water capacity: Mainly 8.0 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Busby Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderately rapid (2.0 to 6.0 inches/hour)

Landform: Alluvial fans, stream terraces, hills
Parent material: Alluvium
Slope range: 0 to 15 percent
Annual precipitation: 11 to 14 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 105 to 125 days

Taxonomic Class: Coarse-loamy, mixed, frigid Aridic Ustochrepts

Typical Pedon

Busby fine sandy loam, 4 to 8 percent slopes, in rangeland, 1,200 feet west and 150 feet south of the northeast corner of sec. 2, T. 23 N., R. 16 E.

A—0 to 4 inches; grayish brown (10YR 5/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; strong fine granular structure; soft, very friable, nonsticky and nonplastic, many very fine and fine roots; mildly alkaline; clear wavy boundary.

Bw—4 to 11 inches; grayish brown (10YR 5/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine tubular pores; slightly effervescent; mildly alkaline; clear wavy boundary.

Bk1—11 to 16 inches; pale brown (10YR 6/3) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak medium prismatic structure parting to weak fine and medium subangular blocky; slightly hard, very friable, nonsticky and nonplastic; common fine and very fine roots; many very fine tubular pores; few fine seams and masses of lime; strongly effervescent; moderately alkaline; clear wavy boundary.

Bk2—16 to 28 inches; pale brown (10YR 6/3) fine sandy loam, grayish brown (10YR 5/2) moist; weak medium prismatic structure; hard, very friable, nonsticky and nonplastic; common very fine roots; many very fine tubular pores; common fine seams and masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

BCk—28 to 60 inches; pale brown (10YR 6/3) fine sandy loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; many very fine tubular pores; few fine masses of lime; strongly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 10 to 18 percent
Depth to the Bk horizon: 10 to 16 inches

A horizon

Hue: 10YR or 2.5Y
 Value: 5 or 6 dry, 3 or 4 moist
 Chroma: 2, 3, or 4
 Clay content: 10 to 18 percent
 Effervescence: none to slight
 Reaction: pH 7.4 to 8.4

Bw horizon

Hue: 10YR or 2.5Y
 Value: 5 or 6 dry, 4 or 5 moist
 Chroma: 2, 3, or 4
 Texture: fine sandy loam, sandy loam, loam
 Clay content: 10 to 18 percent
 Effervescence: none to strongly
 Reaction: pH 7.4 to 8.4

Bk and BCK horizons

Hue: 10YR, 2.5Y, or 5Y
 Value: 6 or 7 dry; 4, 5, or 6 moist
 Chroma: 2, 3, or 4
 Texture: fine sandy loam, sandy loam
 Clay content: 3 to 18 percent
 Effervescence: strongly to violently
 Calcium carbonate equivalent: 5 to 15 percent
 Reaction: pH 7.4 to 8.4

94B—Busby fine sandy loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Slope: 0 to 4 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Busby and similar soils: 85 percent

Minor Components

Yamacall and similar soils: 0 to 5 percent
 Twilight and similar soils: 0 to 5 percent
 Yetull and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Fine sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.7 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

94C—Busby fine sandy loam, 4 to 8 percent slopes

Setting

Landform: Alluvial fans
Slope: 4 to 8 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Busby and similar soils: 85 percent

Minor Components

Yamacall and similar soils: 0 to 5 percent
 Twilight and similar soils: 0 to 5 percent
 Yetull and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Fine sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.7 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

94D—Busby fine sandy loam, 8 to 15 percent slopes

Setting

Landform: Alluvial fans

Slope: 8 to 15 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Busby and similar soils: 85 percent

Minor Components

Yamacall and similar soils: 0 to 5 percent

Twilight and similar soils: 0 to 5 percent

Yetull and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Fine sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 6.7 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

941D—Busby-Twilight fine sandy loams, 4 to 15 percent slopes

Setting

Landform:

* Busby—Hills

* Twilight—Hills

Position on landform:

* Busby—Footslopes

* Twilight—Backslopes and shoulders

Slope:

* Busby—4 to 15 percent

* Twilight—8 to 15 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Busby and similar soils: 60 percent

Twilight and similar soils: 25 percent

Minor Components

Fleak and similar soils: 0 to 5 percent

Yamacall and similar soils: 0 to 3 percent

Slopes more than 15 percent: 0 to 3 percent

Benz and similar soils: 0 to 2 percent

Areas of rock outcrop: 0 to 2 percent

Major Component Description

Busby

Surface layer texture: Fine sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 6.7 inches

Twilight

Surface layer texture: Fine sandy loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Sandstone residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.2 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Cabba Series

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Hills, escarpments

Parent material: Residuum from interbedded sandstone and shale

Slope range: 15 to 70 percent

Annual precipitation: 14 to 19 inches

Annual air temperature: 41 to 45 degrees F
Frost-free period: 90 to 120 days

Taxonomic Class: Loamy, mixed (calcareous), frigid, shallow Typic Ustorthents

Typical Pedon

Cabba loam, in an area of Shambo-Amor-Cabba loams, 15 to 60 percent slopes, in rangeland, 2,100 feet north and 1,000 feet east of the southwest corner of sec. 15, T. 21 N., R. 9 E.

A—0 to 3 inches; grayish brown (2.5Y 5/2) loam, dark grayish brown (2.5Y 4/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; slightly effervescent; mildly alkaline; clear smooth boundary.

BK1—3 to 8 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine pores; common fine masses of lime; strongly effervescent; mildly alkaline; clear wavy boundary.

BK2—8 to 15 inches; pale brown (10YR 6/3) clay loam, brown (10YR 5/3) moist; strong thin platy structure; hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine pores; common fine masses of lime; strongly effervescent; moderately alkaline; clear wavy boundary.

Cr—15 to 60 inches; pale brown (10YR 6/3) interbedded sandstone and shale, brown (10YR 5/3) moist; few very fine and fine roots in vertical cracks in upper part; strongly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 20 to 35 percent
Depth to the Cr horizon: 10 to 20 inches

A horizon

Hue: 10YR or 2.5Y
 Value: 3, 4, 5, or 6 dry; 3 or 4 moist
 Chroma: 1, 2, 3, or 4
 Clay content: 20 to 27 percent
 Rock fragments: 0 to 60 percent—0 to 40 percent stones, cobbles, boulders; 0 to 30 percent pebbles or channers
 Electrical conductivity: 0 to 4 mmhos/cm

Effervescence: slightly to violently
 Reaction: pH 7.4 to 9.0

Bk horizons

Hue: 10YR, 2.5Y, or 5Y
 Value: 5, 6, 7, or 8 dry; 4, 5, 6, or 7 moist
 Chroma: 1, 2, 3, 4, or 6
 Texture: loam, silt loam, clay loam, or silty clay loam
 Clay content: 20 to 35 percent
 Rock fragments: 0 to 35 percent—0 to 5 percent cobbles, 0 to 30 percent pebbles or channers
 Calcium carbonate equivalent: 5 to 15 percent
 Electrical conductivity: 0 to 8 mmhos/cm
 Reaction: pH 7.4 to 9.0

965F—Cabba-Macar loams, 15 to 60 percent slopes

Setting

Landform:

- * Cabba—Escarpments
- * Macar—Hills

Position on landform:

- * Cabba—Backslopes and shoulders
- * Macar—Footslopes

Slope:

- * Cabba—15 to 60 percent
- * Macar—15 to 35 percent

Mean annual precipitation: 14 to 17 inches

Frost-free period: 100 to 120 days

Composition

Major Components

Cabba and similar soils: 45 percent
 Macar and similar soils: 40 percent

Minor Components

Areas of rock outcrop: 0 to 3 percent
 Sagedale and similar soils: 0 to 3 percent
 Vebar and similar soils: 0 to 3 percent
 Wayden and similar soils: 0 to 3 percent
 Cohagen and similar soils: 0 to 2 percent
 Whitlash and similar soils: 0 to 1 percent

Major Component Description

Cabba

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained
Dominant parent material: Interbedded sandstone and shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.5 inches

Macar

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.2 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

201F—Cabba-Wayden-Rock outcrop complex, 25 to 70 percent slopes

Setting

Landform:

- * Cabba—Escarpments
- * Wayden—Escarpments
- * Rock outcrop—Escarpments

Slope:

- * Cabba—25 to 70 percent
- * Wayden—25 to 70 percent

Mean annual precipitation: 14 to 17 inches

Frost-free period: 100 to 120 days

Composition

Major Components

Cabba and similar soils: 35 percent

Wayden and similar soils: 30 percent
 Rock outcrop: 20 percent

Minor Components

Amor and similar soils: 0 to 3 percent
 Macar and similar soils: 0 to 3 percent
 Vebar and similar soils: 0 to 3 percent

Sagedale and similar soils: 0 to 2 percent
 Cohagen and similar soils: 0 to 2 percent
 Soils with loamy sand profiles: 0 to 2 percent

Major Component Description

Cabba

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Interbedded sandstone and shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.5 inches

Wayden

Surface layer texture: Silty clay loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.9 inches

Rock outcrop

Definition: Exposures of sandstone or shale bedrock

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Cabbart Series

Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Sedimentary plains, hills, escarpments
Parent material: Residuum from interbedded sandstone and shale
Slope range: 2 to 70 percent
Annual precipitation: 11 to 14 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 105 to 125 days

Taxonomic Class: Loamy, mixed (calcareous), frigid, shallow Aridic Ustorthents

Typical Pedon

Cabbart loam, in an area of Cabbart-Delpoint loams, 8 to 25 percent slopes, in rangeland, 850 feet east and 2,100 feet north of the southwest corner of sec. 4, T. 25 N., R. 8 E.

A—0 to 4 inches; grayish brown (2.5Y 5/2) loam, dark grayish brown (2.5Y 4/2) moist; moderate fine and very fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; strongly effervescent; mildly alkaline; clear smooth boundary.

Bk—4 to 18 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium prismatic structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine pores; common fine masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

Cr—18 to 60 inches; light yellowish brown (2.5Y 6/4) interbedded sandstone and shale, olive brown (2.5Y 4/4) moist; slightly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 18 to 35 percent
Depth to the Cr horizon: 10 to 20 inches

A horizon

Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7 dry; 3, 4, or 5 moist
Chroma: 2, 3, or 4
Clay content: 18 to 27 percent
Rock fragments: 0 to 15 percent hard fragments—0 to 5 percent cobbles, 0 to 10 percent pebbles
Electrical conductivity: 0 to 4 mmhos/cm
Reaction: pH 7.4 to 9.0

Bk horizon

Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, 7, or 8 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: loam, clay loam, silt loam, silty clay loam
Clay content: 18 to 35 percent
Rock fragments: 0 to 45 percent—0 to 15 percent hard pebbles, 0 to 45 percent soft pebbles
Electrical conductivity: 2 to 8 mmhos/cm
Calcium carbonate equivalent: 15 to 25 percent
Reaction: pH 7.4 to 9.0

21E—Cabbart-Delpoint loams, 8 to 25 percent slopes

Setting

Landform:

- * Cabbart—Hills
- * Delpoint—Hills

Position on landform:

- * Cabbart—Backslopes and shoulders
- * Delpoint—Backslopes and footslopes

Slope:

- * Cabbart—8 to 25 percent
- * Delpoint—8 to 25 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Cabbart and similar soils: 50 percent
Delpoint and similar soils: 35 percent

Minor Components

Yamacall and similar soils: 0 to 5 percent
Busby and similar soils: 0 to 3 percent
Twilight and similar soils: 0 to 3 percent
Fleak and similar soils: 0 to 2 percent
Areas of rock outcrop: 0 to 2 percent

Major Component Description

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Interbedded sandstone and shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.1 inches

Delpoint

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Interbedded sandstone and shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.9 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

212F—Cabbart-Hillon loams, 25 to 70 percent slopes

Setting

Landform:

- * Cabbart—Escarpments
- * Hillon—Escarpments

Position on landform:

- * Cabbart—Backslopes and footslopes
- * Hillon—Backslopes and shoulders

Slope:

- * Cabbart—25 to 70 percent
- * Hillon—25 to 70 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Cabbart and similar soils: 55 percent
Hillon and similar soils: 30 percent

Minor Components

Twilight and similar soils: 0 to 5 percent
Areas of rock outcrop: 0 to 5 percent
Fleak and similar soils: 0 to 3 percent
Forested soils (eastern part): 0 to 2 percent

Major Component Description

Cabbart

Surface layer texture: Loam

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Dominant parent material: Interbedded sandstone and shale residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 3.1 inches

Hillon

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Till

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 10.0 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

211F—Cabbart-Yawdim-Rock outcrop complex, 25 to 70 percent slopes

Setting

Landform:

- * Cabbart—Escarpments
- * Yawdim—Escarpments
- * Rock outcrop—Escarpments

Slope:

- * Cabbart—25 to 70 percent
- * Yawdim—25 to 70 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Cabbart and similar soils: 35 percent
Yawdim and similar soils: 30 percent
Rock outcrop: 20 percent

Minor Components

Twilight and similar soils: 0 to 3 percent
Neldore and similar soils: 0 to 3 percent
Deep and very deep soils: 0 to 3 percent
Fleak and similar soils: 0 to 2 percent
Bascovy and similar soils: 0 to 2 percent
Moderately saline soils: 0 to 2 percent

Major Component Description

Cabbart

Surface layer texture: Loam

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Dominant parent material: Interbedded sandstone and shale residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 3.1 inches

Yawdim

Surface layer texture: Silty clay loam

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Dominant parent material: Shale residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 2.7 inches

Rock outcrop

Definition: Exposures of sandstone or shale bedrock

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Chinook Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderately rapid (2.0 to 6.0 inches/hour)

Landform: Alluvial fans, stream terraces, small drainageways, till plains

Parent material: Alluvium, eolian deposits, glaciofluvial deposits

Slope range: 0 to 10 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Coarse-loamy, mixed Aridic Haploborolls

Typical Pedon

Chinook fine sandy loam, 0 to 4 percent slopes, in cropland, 500 feet north and 2,200 feet west of the southeast corner of sec. 10, T. 25 N., R. 7 E.

Ap—0 to 5 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; many fine and very fine roots; mildly alkaline; abrupt smooth boundary.

Bw—5 to 12 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist; weak medium prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, nonsticky and nonplastic; common fine roots; many very fine and few fine tubular pores; mildly alkaline; clear wavy boundary.

Bk1—12 to 24 inches; light brownish gray (2.5Y 6/2) fine sandy loam, grayish brown (2.5Y 5/2) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; many very fine and few fine tubular pores; lime disseminated and few fine masses; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bk2—24 to 60 inches; light brownish gray (2.5Y 6/2) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; many very fine tubular pores; lime disseminated; strongly effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 15 inches

Content of clay in the control section: 5 to 18 percent

Depth to the Bk horizon: 10 to 24 inches

A horizon

Hue: 10YR or 2.5Y

Value: 2 or 3 moist

Chroma: 2 or 3

Texture: loam or fine sandy loam

Clay content: 5 to 20 percent

Rock fragments: 0 to 35 percent pebbles

Reaction: pH 6.6 to 8.4

Bw horizon

Hue: 10YR or 2.5Y

Value: 4, 5, or 6 dry; 3, 4, or 5 moist

Chroma: 2, 3, or 4

Texture: fine sandy loam or sandy loam

Clay content: 5 to 18 percent and more than 50 percent medium, fine, and coarser sand

Rock fragments: 0 to 15 percent pebbles

Reaction: pH 6.6 to 8.4

Bk1 horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5, 6, or 7 dry; 4 or 5 moist

Chroma: 2, 3, or 4

Texture: fine sandy loam or sandy loam

Clay content: 5 to 15 percent and more than 50 percent medium, fine, and coarser sand

Rock fragments: 0 to 15 percent pebbles
 Calcium carbonate equivalent: 3 to 15 percent
 Reaction: pH 6.6 to 9.0

Bk2 horizon

Hue: 10YR, 2.5Y, or 5Y
 Value: 5, 6, or 7 dry; 4, 5, or 6 moist
 Chroma: 2, 3, or 4
 Texture: fine sandy loam or sandy loam
 Clay content: 5 to 15 percent and more than 50 percent medium, fine, and coarser sand
 Rock fragments: 0 to 15 percent pebbles
 Calcium carbonate equivalent: 5 to 15 percent—few and common masses and threads of lime
 Reaction: pH 6.6 to 9.0

36B—Chinook fine sandy loam, 0 to 4 percent slopes**Setting**

Landform: Alluvial fans, stream terraces, and drainageways
Slope: 0 to 4 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition**Major Components**

Chinook and similar soils: 85 percent

Minor Components

Cozberg and similar soils: 0 to 5 percent
 Fortbenton and similar soils: 0 to 5 percent
 Lihen and similar soils: 0 to 3 percent
 Evanston and similar soils: 0 to 2 percent

Major Component Description

Surface layer texture: Fine sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium or eolian material
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

36C—Chinook fine sandy loam, 4 to 8 percent slopes**Setting**

Landform: Alluvial fans, stream terraces, and drainageways
Slope: 4 to 8 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition**Major Components**

Chinook and similar soils: 85 percent

Minor Components

Cozberg and similar soils: 0 to 5 percent
 Fortbenton and similar soils: 0 to 5 percent
 Lihen and similar soils: 0 to 3 percent
 Slopes more than 8 percent: 0 to 2 percent

Major Component Description

Surface layer texture: Fine sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium or eolian material
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

364B—Chinook loam, 0 to 4 percent slopes**Setting**

Landform: Alluvial fans, stream terraces, and drainageways
Slope: 0 to 4 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition**Major Components**

Chinook and similar soils: 85 percent

Minor Components

Kremlin and similar soils: 0 to 5 percent
 Cozberg and similar soils: 0 to 3 percent
 Lihen and similar soils: 0 to 3 percent
 Chinook fine sandy loam: 0 to 2 percent
 Fortbenton and similar soils: 0 to 2 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciofluvial deposits
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.0 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

364C—Chinook loam, 4 to 8 percent slopes

Setting

Landform: Alluvial fans, stream terraces, and drainageways
Slope: 4 to 8 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Chinook and similar soils: 85 percent

Minor Components

Kremlin and similar soils: 0 to 5 percent
 Chinook fine sandy loam: 0 to 5 percent
 Cozberg and similar soils: 0 to 3 percent
 Lihen and similar soils: 0 to 2 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciofluvial deposits

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.0 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

363C—Chinook-Lihen fine sandy loams, 2 to 10 percent slopes

Setting

Landform:

- * Chinook—Stream terraces
- * Lihen—Sand dunes

Position on landform:

- * Chinook—Backslopes and footslopes
- * Lihen—Backslopes and shoulders

Slope:

- * Chinook—2 to 10 percent
- * Lihen—2 to 10 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Chinook and similar soils: 50 percent
 Lihen and similar soils: 35 percent

Minor Components

Lihen loamy fine sand: 0 to 5 percent
 Yetull and similar soils: 0 to 5 percent
 Fortbenton and similar soils: 0 to 3 percent
 Kremlin and similar soils: 0 to 2 percent

Major Component Description

Chinook

Surface layer texture: Fine sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium or eolian material
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.4 inches

Lihen

Surface layer texture: Fine sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Eolian deposits
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.6 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

362C—Chinook-Yetull complex, 2 to 10 percent slopes**Setting***Landform:*

- * Chinook—Stream terraces
- * Yetull—Sand dunes

Position on landform:

- * Chinook—Backslopes and footslopes
- * Yetull—Backslopes and shoulders

Slope:

- * Chinook—2 to 10 percent
- * Yetull—2 to 10 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition**Major Components**

Chinook and similar soils: 45 percent
 Yetull and similar soils: 40 percent

Minor Components

Fortbenton and similar soils: 0 to 5 percent
 Lonesome and similar soils: 0 to 5 percent
 Cozberg and similar soils: 0 to 3 percent
 Kenilworth and similar soils: 0 to 2 percent

Major Component Description**Chinook**

Surface layer texture: Fine sandy loam
Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium or eolian material

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.4 inches

Yetull

Surface layer texture: Loamy fine sand
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Eolian deposits
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.6 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Cohagen Series

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Permeability: Moderately rapid (2.0 to 6.0 inches/hour)

Landform: Hills

Parent material: Residuum from sandstone

Slope range: 25 to 60 percent

Annual precipitation: 14 to 17 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 100 to 120 days

Taxonomic Class: Loamy, mixed (calcareous), frigid, shallow Typic Ustorthents

Typical Pedon

Cohagen fine sandy loam, in an area of Tally-Cohagen fine sandy loams, 25 to 60 percent slopes, in rangeland, 1,200 feet south and 2,400 feet east of the northwest corner of sec. 6, T. 20 N., R. 13 E.

A—0 to 4 inches; grayish brown (10YR 5/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine, and common medium roots; mildly alkaline; clear wavy boundary.

C—4 to 15 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 4/3) moist; weak fine subangular

blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots and common medium roots; common very fine and fine tubular and irregular pores; slightly effervescent; mildly alkaline; clear smooth boundary.

Cr1—15 to 20 inches; pale brown (10YR 6/3) sandstone with thin lenses of shale, yellowish brown (10YR 5/4) moist; common fine roots matted along plates; slightly effervescent; moderately alkaline; abrupt smooth boundary.

Cr2—20 to 60 inches; light gray (10YR 7/2) sandstone, pale brown (10YR 6/3) moist; mildly alkaline.

Range in Characteristics

Content of clay in the control section: 10 to 18 percent

Depth to the Cr horizon: 10 to 20 inches

A horizon

Hue: 10YR or 2.5Y

Value: 4, 5, or 6 dry; 3 or 4 moist

Chroma: 2, 3, or 4

Clay content: 10 to 18 percent

Reaction: pH 7.4 to 7.8

C horizon

Hue: 10YR or 2.5Y

Value: 5, 6, or 7 dry; 4 or 5 moist

Chroma: 2, 3, or 4

Texture: fine sandy loam, sandy loam

Clay content: 10 to 18 percent

Rock fragments: 0 to 5 percent pebbles

Reaction: pH 7.4 to 8.4

Cozberg Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderately rapid (2.0 to 6.0 inches/hour) to 34 inches; below this depth rapid (6.0 to 20.0 inches/hour)

Landform: Stream terraces

Parent material: Alluvium

Slope range: 0 to 4 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Coarse-loamy, mixed Aridic Haploborolls

Typical Pedon

Cozberg fine sandy loam, in an area of Cozberg-

Chinook fine sandy loams, 0 to 4 percent slopes, in rangeland, 1,500 feet east and 2,200 feet north of the southwest corner of sec. 33, T. 29 N., R. 13 E.

Ap—0 to 6 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; neutral, clear smooth boundary.

Bw—6 to 17 inches; brown (10YR 5/3) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak medium prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine and few fine tubular pores; neutral; clear wavy boundary.

Bk1—17 to 22 inches; pale brown (10YR 6/3) fine sandy loam, brown (10YR 5/3) moist; weak medium prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine and few fine tubular pores; common fine masses of lime; strongly effervescent; moderately alkaline; clear wavy boundary.

Bk2—22 to 34 inches; light brownish gray (2.5Y 6/2) fine sandy loam, grayish brown (2.5Y 5/2) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine tubular pores; many fine masses and seams of lime; strongly effervescent; moderately alkaline; abrupt wavy boundary.

2C—34 to 60 inches; light brownish gray (2.5Y 6/2) sand and coarse sand, grayish brown (2.5Y 5/2) moist; single grain; loose, nonsticky and nonplastic; many fine irregular pores; strongly effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 14 inches

Content of clay in the control section: 10 to 18 percent

Depth to the Bk horizon: 16 to 28 inches

Depth to the 2C horizon: 20 to 40 inches

A horizon

Value: 2 or 3 moist

Chroma: 2 or 3

Clay content: 10 to 20 percent

Rock fragments: 0 to 10 percent pebbles

Reaction: pH 6.6 to 7.8

Bw horizon

Value: 3 or 4 moist
 Chroma: 2 or 3
 Texture: fine sandy loam, very fine sandy loam, sandy loam
 Clay content: 10 to 18 percent
 Rock fragments: 0 to 15 percent
 Reaction: pH 6.6 to 7.8

Bk horizons

Value: 5 or 6 dry, 4 or 5 moist
 Chroma: 2, 3, or 4
 Texture: fine sandy loam, sandy loam, very fine sandy loam
 Clay content: 10 to 18 percent
 Rock fragments: 0 to 15 percent
 Calcium carbonate equivalent: 5 to 15 percent
 Reaction: pH 6.6 to 7.8

2C horizon

Hue: 10YR or 2.5Y
 Value: 5, 6, or 7 dry; 4, 5, or 6 moist
 Chroma: 2, 3, or 4
 Texture: loamy sand, sand, loamy coarse sand, coarse sand
 Clay content: 0 to 10 percent
 Rock fragments: 0 to 35 percent pebbles
 Reaction: pH 7.4 to 8.4

363B—Cozberg-Chinook fine sandy loams, 0 to 4 percent slopes

Setting

Landform:

- * Cozberg—Stream terraces
- * Chinook—Stream terraces

Slope:

- * Cozberg—0 to 4 percent
- * Chinook—0 to 4 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Cozberg and similar soils: 50 percent
 Chinook and similar soils: 35 percent

Minor Components

Lihen and similar soils: 0 to 5 percent
 Fortbenton and similar soils: 0 to 5 percent
 Degrand and similar soils: 0 to 3 percent
 Kremlin and similar soils: 0 to 2 percent

Major Component Description

Cozberg

Surface layer texture: Fine sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.2 inches

Chinook

Surface layer texture: Fine sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Creed Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Alluvial fans, stream terraces, small drainageways
Parent material: Alluvium, glaciofluvial deposits
Slope range: 0 to 8 percent
Annual precipitation: 11 to 14 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 105 to 125 days

Taxonomic Class: Fine, montmorillonitic Typic Natriboralfs

Typical Pedon

Creed loam, in an area of Ferd-Creed-Gerdrum complex, 0 to 4 percent slopes, in rangeland, 900 feet south and 1,400 feet west of the northeast corner of sec. 20, T. 27 N., R. 5 E.

A—0 to 2 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; moderate fine granular structure; soft, very friable, slightly sticky

and slightly plastic; many very fine and fine roots; neutral; clear smooth boundary.

E—2 to 6 inches; light brownish gray (10YR 6/2) loam, grayish brown (10YR 5/2) moist; moderate thin platy structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine tubular pores; neutral; clear smooth boundary.

Bt—6 to 12 inches; brown (10YR 5/3) silty clay loam, dark brown (10YR 4/3) moist; strong fine columnar structure parting to strong fine subangular blocky; very hard, firm, sticky and plastic; many fine roots; common very fine tubular pores; many distinct clay films on faces of peds; mildly alkaline; clear wavy boundary.

Bkn—12 to 26 inches; grayish brown (10YR 5/2) silty clay loam, dark grayish brown (10YR 4/2) moist; moderate medium prismatic structure parting to strong fine and medium subangular blocky; very hard, friable, sticky and plastic; common fine roots; common very fine tubular pores; common fine and medium masses of lime; violently effervescent; moderately alkaline; clear wavy boundary.

Bkny—26 to 46 inches; grayish brown (2.5Y 5/2) silty clay loam; dark grayish brown (2.5Y 4/2) moist; moderate fine and medium subangular blocky structure; hard, friable, sticky and plastic; few very fine roots; common very fine tubular pores; many fine seams and medium masses of gypsum; few fine masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

BCny—46 to 60 inches; light yellowish brown (2.5Y 6/4) silty clay loam; olive brown (2.5Y 4/4) moist; massive; hard, friable, sticky and plastic; common very fine tubular pores; few fine masses of gypsum; strongly effervescent; strongly alkaline.

Range in Characteristics

Content of clay in the control section: 35 to 55 percent

Depth to the Bkn horizon: 10 to 20 inches

Depth to the Bkny horizon: 22 to 36 inches

A horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 or 3

Clay content: 20 to 27 percent

Reaction: pH 6.6 to 8.4

E horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5, 6, or 7 dry; 4, 5, 6, or 7 moist

Chroma: 2 or 3

Texture: loam, sandy loam, sandy clay loam, clay loam, silty clay loam

Clay content: 20 to 35 percent

Reaction: pH 6.6 to 8.4

Bt horizons

Hue: 10YR, 2.5Y, or 5Y

Value: 4, 5, or 6 dry; 3, 4, or 5 moist

Chroma: 2 or 3

Texture: clay loam, silty clay loam, clay, silty clay

Clay content: 35 to 55 percent

Electrical conductivity: 2 to 4 mmhos/cm

Sodium adsorption ratio: 8 to 13

Bkn, Bkny, Bky, and BCny horizons

Hue: 10YR, 2.5Y, or 5Y

Value: 4, 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 2, 3, or 4

Texture: silty clay loam, clay loam, sandy clay loam, loam, clay

Clay content: 25 to 40 percent

Calcium carbonate equivalent: 5 to 15 percent

Electrical conductivity: 4 to 16 mmhos/cm

Sodium adsorption ratio: 13 to 25

Gypsum content: 0 to 2 percent

Reaction: pH 7.9 to 9.0

Crow Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Slow (0.06 to 0.2 inch/hour)

Landform: Mountains

Parent material: Slope alluvium from shale

Slope range: 8 to 25 percent

Annual precipitation: 18 to 22 inches

Annual air temperature: 40 to 43 degrees F

Frost-free period: 70 to 100 days

Taxonomic Class: Fine, mixed Glossic Eutroboralfs

Typical Pedon

Crow loam, in an area of Crow-Lubrecht loams, 8 to 35 percent slopes, in forest, 900 feet east and 900 feet south of the northwest corner of sec. 16, T. 28 N., R. 15 E.

O—2 inches to 0; slightly decomposed forest litter.

A—0 to 4 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; strong medium granular and moderate fine subangular

blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and medium roots and few coarse roots; 5 percent pebbles; slightly acid; clear smooth boundary.

E—4 to 12 inches; light gray and light brownish gray (10YR 7/2) and (10YR 6/2) loam, grayish brown (10YR 5/2) moist; strong fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and medium roots and few coarse roots; 5 percent pebbles; slightly acid; clear smooth boundary.

E/Bt—12 to 17 inches; E part (60 percent) is light gray (2.5Y 7/2) loam, grayish brown (2.5Y 5/2) moist; the B part (40 percent) is grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; strong fine and medium subangular blocky structure; hard, friable, sticky and plastic; common fine and medium roots; many very fine and fine tubular pores; 5 percent pebbles; neutral; gradual wavy boundary.

Bt1—17 to 30 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; strong medium subangular blocky structure; extremely hard, firm, sticky and very plastic; common very fine and fine roots; common very fine tubular pores; many faint clay films and unstained sand grains on faces of peds; interfingering of E material into upper 6 inches; 5 percent pebbles; neutral; gradual wavy boundary.

Bt2—30 to 45 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium subangular blocky structure; very hard, friable, sticky and plastic; few fine roots; common very fine tubular pores; common faint clay films and unstained sand grains on faces of peds; 5 percent pebbles; neutral; gradual wavy boundary.

BC—45 to 60 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure; very hard, friable, sticky and plastic; few fine roots; common very fine tubular pores; 5 percent pebbles; neutral.

Range in Characteristics

Content of clay in the control section: 35 to 60 percent

A horizon

Value: 4, 5, or 6 dry; 3, 4, or 5 moist
Chroma: 2 or 3

Clay content: 20 to 27 percent
Rock fragments: 0 to 25 percent—0 to 5 percent cobbles, 0 to 25 percent pebbles
Reaction: pH 5.6 to 6.5

E horizon

Value: 5, 6, or 7 dry; 4 or 5 moist
Chroma: 2 or 3
Clay content: 20 to 27 percent
Rock fragments: 0 to 25 percent—0 to 5 percent cobbles, 0 to 25 percent pebbles
Reaction: pH 5.6 to 6.5

E/Bt horizon

Hue: 10YR or 2.5Y
Value: E part 6, 7, or 8, B part 5 or 6 dry; E part 5 or 6, B part 4 or 5 moist
Chroma: E part 2 or 3, B part 2, 3, or 4
Texture, mixed: silty clay loam, clay loam, loam, silt loam
Clay content, mixed: 20 to 40 percent
Rock fragments: 0 to 25 percent—0 to 5 percent cobbles, 0 to 25 percent pebbles
Reaction: pH 6.1 to 7.3

Bt1 and Bt2 horizons

Hue: 10YR or 2.5Y
Value: 4, 5, or 6 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Texture: silty clay, clay, sandy clay, clay loam
Clay content: 35 to 60 percent
Rock fragments: 0 to 35 percent—0 to 10 percent cobbles, 0 to 25 percent pebbles
Reaction: pH 6.1 to 7.3

BC horizon

Hue: 2.5Y, 10YR, or 7.5YR
Value: 6 or 7 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: sandy clay loam, clay loam, loam, sandy loam
Clay content: 20 to 35 percent
Rock fragments: 5 to 35 percent—0 to 10 percent cobbles, 5 to 25 percent pebbles
Reaction: pH 6.1 to 7.3

630E—Crow-Lubrecht loams, 8 to 35 percent slopes

Setting

Landform:

* Crow—Mountains
* Lubrecht—Mountains

Position on landform:

- * Crow—Footslopes
- * Lubrecht—Backslopes and shoulders

Slope:

- * Crow—8 to 25 percent
- * Lubrecht—8 to 35 percent

Mean annual precipitation: 18 to 22 inches*Frost-free period:* 70 to 100 days**Composition****Major Components**

Crow and similar soils: 45 percent
 Lubrecht and similar soils: 40 percent

Minor Components

Ambrant and similar soils: 0 to 5 percent
 Belain and similar soils: 0 to 5 percent
 Winkler and similar soils: 0 to 3 percent
 Soils with quaking aspen trees: 0 to 2 percent

Major Component Description**Crow**

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 9.3 inches

Lubrecht

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Shale residuum
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.5 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Daglum Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained

Permeability: Slow (0.06 to 0.2 inch/hour)*Landform:* Glaciated till plains, stream terraces, drainageways*Parent material:* Alluvial fans, glaciofluvial deposits, glacial till*Slope range:* 0 to 2 percent*Annual precipitation:* 14 to 17 inches*Annual air temperature:* 42 to 45 degrees F*Frost-free period:* 100 to 120 days

Taxonomic Class: Fine, montmorillonitic Vertic
 Natriborolls

Typical Pedon

Daglum loam, in an area of Bearpaw-Daglum complex, 0 to 2 percent slopes, in cropland, 2,600 feet north and 2,350 feet west of the southeast corner of sec. 36, T. 23 N., R. 13 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to strong medium granular; soft, very friable, slightly sticky and slightly plastic; common fine and very fine roots; neutral; abrupt smooth boundary.

E—7 to 12 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; weak medium prismatic structure parting to moderately thick platy; slightly hard, very friable, slightly sticky and slightly plastic; common fine and very fine roots; many very fine tubular pores; mildly alkaline; abrupt smooth boundary.

Bt—12 to 20 inches; brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; strong fine and medium columnar structure parting to strong medium subangular blocky in the lower part; very hard, firm, sticky and plastic; common very fine roots; common very fine tubular pores; many distinct clay films on faces of peds; mildly alkaline; gradual wavy boundary.

Bkn—20 to 30 inches; pale brown (10YR 6/3) clay loam, brown (10YR 5/3) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; hard, firm, sticky and plastic; few very fine roots; common very fine tubular pores; few fine masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bkny—30 to 60 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist;

moderate medium subangular blocky structure; hard, very firm, sticky and plastic; few very fine roots; many very fine tubular pores; common fine masses of lime; few fine masses of gypsum; violently effervescent; strongly alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 10 inches

Content of clay in the control section: 35 to 60 percent

Depth to seasonal water table: Moderately wet phase
48 to 72 inches

Depth to the Bk horizon: 12 to 20 inches

Depth to the Bkny horizon: 16 to 30 inches

Soil phases: Moderately wet

A horizon

Hue: 10YR

Value: 3, 4, or 5 dry; 2 or 3 moist

Chroma: 2

Clay content: 18 to 27 percent

Reaction: pH 6.1 to 7.8

E horizon

Hue: 10YR or 2.5Y

Value: 4, 5, 6, or 7 dry; 3, 4, or 5 moist

Chroma: 1 or 2

Clay content: 20 to 27 percent

Reaction: pH 6.1 to 7.8

Bt horizon

Hue: 10YR or 2.5Y

Value: 3, 4, 5, or 6 dry; 2, 3, 4, or 5 moist

Chroma: 2 or 3

Texture: clay, silty clay, silty clay loam, clay loam

Clay content: 35 to 60 percent

Reaction: pH 6.6 to 9.0

Some pedons have gypsum accumulation in the B and C horizons; some pedons have a Bk horizon

Bkn and Bkny horizons

Hue: 10YR, 2.5Y, or 5Y

Value: 5, 6, or 7 dry; 3, 4, 5, or 6 moist

Chroma: 1, 2, 3, or 4

Texture: clay loam, silty clay, silty clay loam, clay

Reaction: pH 7.9 to 9.0, slightly alkaline to strongly alkaline

Degrand Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour) to 28 inches; below this depth rapid (6.0 to 20.0 inches/hour)

Landform: Stream terraces, alluvial fans, small drainageways

Parent material: Glaciofluvial deposits

Slope range: 0 to 4 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Fine-loamy over sandy or sandy-skeletal, mixed Aridic Argiborolls

Typical Pedon

Degrand loam, 0 to 4 percent slopes, in cropland, 2,450 feet south and 1,100 feet west of the northeast corner of sec. 31, T. 25 N., R. 6 E.

Ap—0 to 6 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; strong fine and medium granular structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots; neutral; abrupt smooth boundary.

Bt—6 to 11 inches; brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, friable, sticky and plastic; common very fine and fine roots; many very fine tubular pores; common thin brown (10YR 4/3) clay films on faces of peds; neutral; clear wavy boundary.

Bk1—11 to 20 inches; light brownish gray (10YR 6/2) and light gray (10YR 7/2) loam, grayish brown (10YR 5/2) moist; weak coarse prismatic structure parting to moderate fine and medium subangular blocky; hard, friable, sticky and plastic; common very fine and fine roots; many very fine tubular pores; many medium and coarse masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk2—20 to 28 inches; light gray (10YR 7/2) loam, grayish brown (10YR 5/2) moist; moderate fine and medium subangular blocky structure; hard, very friable, sticky and plastic; few very fine roots; many very fine tubular pores; violently effervescent; disseminated lime; moderately alkaline; clear wavy boundary.

2C1—28 to 40 inches; light brownish gray (10YR 6/2) loamy sand, dark grayish brown (10YR 4/2) moist; single grain; loose, nonsticky and nonplastic; many very fine and fine irregular pores; 5 percent

pebbles; strongly effervescent; moderately alkaline; gradual wavy boundary.

2C2—40 to 60 inches; grayish brown (10YR 5/2) sand and coarse sand, dark grayish brown (10YR 4/2) moist; single grain; loose, nonsticky and nonplastic; many very fine and fine irregular pores; 10 percent pebbles; slightly effervescent; mildly alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 16 inches, may include part or all of the Bt horizon

Depth to the Bk horizon: 10 to 16 inches

Depth to the 2C horizon: 20 to 40 inches

Ap horizon

Hue: 10YR or 2.5Y

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 2 or 3

Clay content: 10 to 27 percent

Rock fragments: 0 to 15 percent—0 to 5 percent

cobbles, 0 to 10 percent pebbles

Reaction: pH 6.6 to 7.8

Bt horizon

Hue: 10YR or 2.5Y

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2 or 3

Texture: clay loam, sandy clay loam

Clay content: 20 to 35 percent (sand content 35 to 55 percent)

Rock fragments: 0 to 15 percent—0 to 5 percent

cobbles, 0 to 10 percent pebbles

Reaction: pH 6.6 to 7.8

Bk horizons

Hue: 10YR or 2.5Y

Value: 6 or 7 dry; 4, 5, or 6 moist

Chroma: 2 or 3

Texture: sandy clay loam, loam, or clay loam

Clay content: 15 to 30 percent

Rock fragments: 0 to 15 percent—0 to 5 percent

cobbles, 0 to 10 percent pebbles

Electrical conductivity: less than 4 mmhos/cm

Calcium carbonate equivalent: 15 to 40 percent

Reaction: pH 7.4 to 8.4

2C horizons

Hue: 10YR or 2.5Y

Value: 5, 6, or 7 dry; 4 or 5 moist

Chroma: 2 or 3

Texture: sand, coarse sand, fine sand, loamy sand

Clay content: 0 to 5 percent

Rock fragments: 0 to 35 percent—0 to 5 percent

cobbles, 0 to 30 percent pebbles

Calcium carbonate equivalent: 8 to 15 percent

Reaction: pH 7.4 to 8.4

16B—Degrand loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans, stream terraces, and drainageways

Slope: 0 to 4 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Degrand and similar soils: 85 percent

Minor Components

Evanston and similar soils: 0 to 5 percent

Cozberg and similar soils: 0 to 5 percent

Tinsley and similar soils: 0 to 3 percent

Chinook and similar soils: 0 to 2 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Glaciofluvial deposits

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Delpoint Series

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Sedimentary plains, hills

Parent material: Residuum from interbedded sandstone and shale

Slope range: 0 to 25 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Fine-loamy, mixed, frigid Aridic Ustochrepts

Typical Pedon

Delpoint loam, in an area of Cabbart-Delpoint loams, 8 to 25 percent slopes, in rangeland, 2,000 feet north and 800 feet east of the southwest corner of sec. 4, T. 25 N., R. 8 E.

A—0 to 4 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; strongly effervescent; mildly alkaline; clear smooth boundary.

Bw—4 to 12 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; weak medium prismatic structure parting to moderate fine and medium subangular blocky; very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine tubular pores; strongly effervescent; moderately alkaline; clear wavy boundary.

Bk1—12 to 16 inches; light brownish gray (2.5Y 6/2) loam, grayish brown (2.5Y 5/2) moist; moderate fine subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine tubular pores; common fine seams and masses of lime; violently effervescent; moderately alkaline; clear wavy boundary.

Bk2—16 to 30 inches; light brownish gray (2.5Y 6/2) loam, grayish brown (2.5Y 5/2) moist; weak fine subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; common fine seams and masses of lime; strongly effervescent; moderately alkaline; clear wavy boundary.

Cr—30 to 60 inches; light brownish gray and light yellowish brown (2.5Y 6/2 and 6/4) interbedded sandstone and shale, light olive (2.5Y 5/4) moist; slightly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 18 to 35 percent

Depth to the Bk horizon: 10 to 16 inches

Depth to the Cr horizon: 20 to 40 inches

A horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry; 3, 4, or 5 moist

Chroma: 2, 3, or 4

Clay content: 18 to 27 percent
Rock fragments: 0 to 5 percent pebbles
Effervescence: none to strongly
Reaction: pH 7.4 to 8.4

Bw horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5, 6, or 7 dry; 4 or 5 moist

Chroma: 2, 3, or 4

Texture: loam, clay loam, silty clay loam

Clay content: 18 to 35 percent

Rock fragments: 0 to 15 percent pebbles

Effervescence: none to violently

Reaction: pH 7.9 to 8.4

Bk horizons

Hue: 10YR, 2.5Y, or 5Y

Value: 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 2, 3, or 4

Texture: loam, sandy loam, clay loam, silty clay loam

Clay content: 18 to 35 percent

Rock fragments: 0 to 15 percent pebbles

Calcium carbonate equivalent: 5 to 15 percent

Effervescence: strongly or violently

Reaction: pH 7.9 to 8.4

17B—Delpoint loam, 0 to 4 percent slopes

Setting

Landform: Sedimentary plains

Slope: 0 to 4 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Delpoint and similar soils: 85 percent

Minor Components

Cabbart and similar soils: 0 to 5 percent

Yamacall, calcareous soils: 0 to 5 percent

Yamacall and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Interbedded sandstone and shale residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.9 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

171C—Delpoint-Cabbart loams, 2 to 8 percent slopes

Setting

Landform:

- * Delpoint—Sedimentary plains
- * Cabbart—Sedimentary plains

Position on landform:

- * Delpoint—Backslopes and footslopes
- * Cabbart—Backslopes and shoulders

Slope:

- * Delpoint—2 to 8 percent
- * Cabbart—2 to 8 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Delpoint and similar soils: 50 percent

Cabbart and similar soils: 35 percent

Minor Components

Yamacall and similar soils: 0 to 5 percent

Twilight and similar soils: 0 to 5 percent

Fleak and similar soils: 0 to 3 percent

Areas of rock outcrop: 0 to 2 percent

Major Component Description

Delpoint

Surface layer texture: Loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Interbedded sandstone and shale residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.9 inches

Cabbart

Surface layer texture: Loam

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Dominant parent material: Interbedded sandstone and shale residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 3.1 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

DA—Denied access

Composition

Major Components

Denied access: 100 percent

Major Component Description

Definition: Areas where mapping access was denied by landowner

Eaglecreek Series

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Hills

Parent material: Residuum from igneous rocks

Slope range: 25 to 45 percent

Annual precipitation: 18 to 24 inches

Annual air temperature: 40 to 43 degrees F

Frost-free period: 70 to 100 days

Taxonomic Class: Fine-loamy, mixed Mollic Eutroboralfs

Typical Pedon

Eaglecreek loam, in an area of Lacey Creek-Eaglecreek loams, 15 to 45 percent slopes, in woodland, 1,400 feet north and 2,500 feet east of the southwest corner of sec. 1, T. 27 N., R. 15 E.

Oi—1 inch to 0; partly decomposed needles and twigs.

A—0 to 4 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; weak thin platy structure parting to strong fine granular; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine and few medium and coarse roots; 10 percent pebbles; slightly acid; abrupt wavy boundary.

E—4 to 10 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; weak fine and medium subangular blocky structure parting to strong fine and medium granular; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine and few medium and coarse roots; many very fine tubular pores; 10 percent pebbles; slightly acid; clear wavy boundary.

Bt1—10 to 18 inches; brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; strong medium subangular blocky structure; very hard, friable, sticky and plastic; common fine and very fine and few medium and coarse roots; many very fine tubular pores; many distinct clay films on faces of peds; few skeletons on faces of peds in upper 3 inches; 10 percent pebbles; slightly acid; clear wavy boundary.

Bt2—18 to 32 inches; grayish brown (10YR 5/2) gravelly sandy clay loam, dark brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; hard, very friable, sticky and slightly plastic; common fine and very fine and few medium roots; many very fine tubular pores; common faint clay films on faces of peds and bridging sand grains; 20 percent pebbles; neutral; clear wavy boundary.

R—32 inches; hard igneous bedrock.

Range in Characteristics

Content of clay in the control section: 18 to 35 percent

Rock fragments in the control section: 5 to 25 percent

Depth to bedrock: 20 to 40 inches

Depth to the Bt1 horizon: 6 to 10 inches

A horizon

Value: 3 or 4 dry, 2 or 3 moist

Chroma: 1 or 2

Clay content: 12 to 22 percent

Rock fragments: 0 to 15 percent—0 to 5 percent cobbles, 0 to 10 percent pebbles

Reaction: pH 6.1 to 6.5

E horizon

Hue: 10YR or 7.5YR

Value: 4, 5, or 6 dry; 3 or 4 moist

Texture: loam, sandy loam

Clay content: 10 to 18 percent

Rock fragments: 0 to 15 percent—0 to 5 percent cobbles, 0 to 10 percent pebbles

Reaction: pH 6.1 to 6.5

Bt horizons

Hue: 10YR, 7.5YR, or 5YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2 or 3

Texture: loam, clay loam, sandy clay loam

Clay content: 18 to 35 percent

Rock fragments: 5 to 25 percent—0 to 5 percent cobbles, 5 to 20 percent pebbles

Reaction: pH 6.1 to 7.3

Eagleton Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Poorly drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Flood plains

Parent material: Alluvium

Slope range: 0 to 2 percent

Annual precipitation: 14 to 17 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 100 to 120 days

Taxonomic Class: Fine-loamy, mixed, frigid Cumulic Endoaquolls

Typical Pedon

Eagleton loam, in an area of Enbar-Straw-Eagleton loams, 0 to 2 percent slopes, in hayland, 1,900 feet west and 1,100 feet south of the northeast corner of sec. 18, T. 27., R. 17 E.

Ap—0 to 6 inches; very dark brown (10YR 2/2) loam, dark grayish brown (10YR 4/2) dry; few fine distinct dark yellowish brown (10YR 4/4) mottles; strong medium and coarse granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine and common medium roots; neutral; abrupt smooth boundary.

A2—6 to 19 inches; very dark grayish brown (10YR 3/2) loam with thin strata of fine sandy loam and clay loam, grayish brown (10YR 5/2) dry; common fine distinct dark yellowish brown (10YR 4/4)

mottles; weak fine subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; common fine and very fine and few medium roots; common very fine tubular pores; neutral; clear wavy boundary.

A3—19 to 38 inches; very dark grayish brown (10YR 3/2) loam with thin strata of fine sandy loam and clay loam, dark grayish brown (10YR 4/2) dry; common fine and medium distinct dark yellowish brown (10YR 4/6) mottles; weak fine and medium subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; few fine and very fine roots; common very fine tubular pores; mildly alkaline; clear wavy boundary.

Cg—38 to 60 inches; black (5Y 2.5/1) loam with strata of silty clay loam, dark gray (5Y 4/1) dry; massive; hard, friable, slightly sticky and slightly plastic; common very fine tubular pores; neutral.

Range in Characteristics

Mollic epipedon thickness: 24 to 60 inches

Content of clay in the control section: 18 to 35 percent

Depth to seasonal high water table: 12 to 24 inches

Ap horizon

Value: 3, 4, or 5 dry; 2 or 3 moist

Mottles: none or few (Hue: 10YR; Value: 5 or 6 dry, 4 moist; Chroma: 4 or 6)

Clay content: 18 to 27 percent

Reaction: pH 6.6 to 7.8

A2 horizon

Hue: 10YR

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 1 or 2

Mottles: few or common (Hue: 10YR; Value: 5 or 6 dry, 4 moist; Chroma: 4 or 6)

Texture: loam, clay loam, or silty clay loam consisting of thin layers of sandy loam, fine sandy loam, sandy clay loam, or clay loam

Clay content: 18 to 35 percent

Reaction: pH 6.6 to 7.8

A3 horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 4 or 5 dry, 3 moist

Chroma: 1 or 2

Mottles: common or many (Hue: 10YR; Value: 5 or 6 dry, 4 moist; Chroma: 4, 6, or 8)

Texture: loam or clay loam consisting of thin layers of sandy loam, fine sandy loam, sandy clay loam, or clay loam

Clay content: 18 to 35 percent

Reaction: pH 6.6 to 7.8

Cg horizon

Hue: 5Y, N

Value: 4 or 5 dry; 2, 3, 4, or 5 moist

Chroma: 1 or 0

Mottles: none to common (Hue: 10YR; Value: 5 or 6 dry, 4 moist; Chroma: 4 or 6)

Texture: loam or clay loam consisting of thin layers of sandy loam, fine sandy loam, sandy clay loam, clay loam, or silty clay loam

Clay content: 18 to 35 percent

Reaction: pH 6.6 to 7.8

Elkner Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Somewhat excessively drained

Permeability: Moderately rapid (2.0 to 6.0 inches/hour)

Landform: Mountains

Parent material: Residuum or colluvium from igneous rocks

Slope range: 25 to 45 percent

Annual precipitation: 20 to 28 inches

Annual air temperature: 38 to 42 degrees F

Frost-free period: 50 to 70 days

Taxonomic Class: Coarse-loamy, mixed Typic Cryochrepts

Typical Pedon

Elkner sandy loam, in an area of Garlet-Elkner complex, 25 to 70 percent slopes, in forest, 1,300 feet north and 25 feet west of the southeast corner of sec. 27, T. 28 N., R. 15 E.

O—3 inches to 0; slightly decomposed forest litter.

A—0 to 5 inches; grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; strong fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many fine roots and common medium and coarse roots; slightly acid; clear wavy boundary.

E—5 to 15 inches; pale brown (10YR 6/3) sandy loam, dark grayish brown (10YR 4/2) moist; moderate fine subangular blocky structure parting to strong medium granular; slightly hard, very friable, slightly sticky and slightly plastic; many fine roots and common medium and coarse roots; many very fine tubular pores; slightly acid; clear wavy boundary.

E and Bt—15 to 23 inches; E part (70 percent) is pale brown (10YR 6/3) sandy loam, dark grayish brown (10YR 4/2) moist; B part (about 30 percent) is brown (10YR 5/3) sandy loam lamellae 1/4-inch

thick, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and medium roots; many very fine tubular pores; slightly acid; gradual wavy boundary.

Bt and E—23 to 32 inches; B part (about 60 percent) is brown (10YR 5/3) discontinuous sandy loam lamellae up to 1/2-inch thick, dark brown (10YR 3/3) moist; E part (40 percent) is pale brown (10YR 6/3) sandy loam, dark grayish brown (10YR 4/2) moist; sandy loam mixed (E and B) texture; strong fine and medium subangular blocky structure; hard, very friable, sticky and plastic; common fine and medium roots; many very fine tubular pores; 10 percent angular pebbles; slightly acid; gradual wavy boundary.

BC1—32 to 40 inches; brown (10YR 5/3) coarse sandy loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common fine and medium roots; many very fine tubular and irregular pores and few fine tubular and irregular pores; slightly acid; gradual wavy boundary.

BC2—40 to 60 inches; grayish brown (10YR 5/2) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; few fine roots; many very fine tubular and irregular pores and common fine tubular and irregular pores; neutral.

Range in Characteristics

Content of clay in the control section: 5 to 10 percent

A and E horizons

Value: 5, 6, or 7 dry; 3, 4, or 5 moist
 Chroma: 2, 3, or 4
 Texture: sandy loam or coarse sandy loam
 Clay content: 5 to 10 percent
 Rock fragments: 0 to 35 percent—0 to 35 percent cobbles, stones, or boulders; 0 to 20 percent pebbles
 Reaction: pH 5.6 to 6.5

E and Bt, Bt and E horizons

Hue: E part 10YR, B part 10YR or 2.5Y
 Value: E part 6 or 7, B part 4 or 5 dry; E part 4 or 5, B part 4 or 5 moist
 Chroma: E part 2, 3, or 4; B part 3 or 4
 Texture: coarse sandy loam, sandy loam
 Clay content: 5 to 10 percent, lamellae has less than 3 percent increase in clay
 Rock fragments: 0 to 20 percent—0 to 15 percent

cobbles, stones, or boulders; 5 to 20 percent pebbles

Reaction: pH 5.6 to 6.5

BC horizons

Hue: 10YR or 2.5Y

Value: 5, 6, or 7 dry; 3, 4, or 5 moist

Chroma: 2, 3, or 4

Texture: loamy coarse sand, coarse sandy loam

Clay content: 0 to 5 percent

Structure: single grain to subangular blocky

Rock fragments: 0 to 35 percent—0 to 20 percent cobbles and stones, 5 to 20 percent pebbles

Reaction: pH 5.6 to 7.3

Elloam Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Very slow (<0.06 inch/hour)

Landform: Till plains

Parent material: Glacial till

Slope range: 0 to 8 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Fine, montmorillonitic Typic Natriboralfs

Typical Pedon

Elloam clay loam, in an area of Kevin-Elloam clay loams, 2 to 8 percent slopes, in rangeland, 1,450 feet east and 2,340 feet south of the northwest corner of sec. 6, T. 27 N., R. 6 E.

E—0 to 3 inches; light gray (10YR 7/2) loam, grayish brown (10YR 5/2) moist; moderate thin platy structure with a vesicular crust; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine vesicular pores; neutral; abrupt smooth boundary.

Bt1—3 to 8 inches; brown (10YR 5/3) clay, dark brown (10YR 4/3) moist; strong fine and medium columnar structure parting to strong fine and medium subangular blocky; extremely hard, firm, very sticky and very plastic; many very fine and fine roots; many very fine and few fine tubular pores; many faint and common distinct clay films on faces of peds; continuous light gray (10YR 7/2) skeletons on tops of columns; mildly alkaline; clear smooth boundary.

Btn2—8 to 12 inches; pale brown (10YR 6/3) clay, brown (10YR 5/3) moist; strong fine and medium prismatic structure parting to strong fine and medium subangular blocky; extremely hard, firm, sticky and plastic; common very fine and fine roots along faces of peds; many very fine and fine pores; many distinct clay films on faces of peds; slightly effervescent; moderately alkaline; clear wavy boundary.

Bkn—12 to 18 inches; pale brown (10YR 6/3) clay loam, brown (10YR 5/3) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; very hard, friable, sticky and plastic; many very fine roots; many very fine tubular pores; many medium masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bknyz—18 to 29 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, sticky and plastic; few very fine roots; few very fine tubular pores; few medium masses of gypsum and few fine masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bnyz—29 to 60 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, sticky and plastic; few very fine tubular pores; few fine and medium masses of gypsum and other salts; slightly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 35 to 55 percent

Depth to the Bk horizon: 8 to 18 inches

Depth to the By horizon: 12 to 25 inches

E horizon

Hue: 10YR or 2.5Y

Value: 5, 6, or 7 dry; 4 or 5 moist

Chroma: 2 or 3

Clay content: 20 to 27 percent; 30 to 35 percent where mixed to 7 inches

Rock fragments: 0 to 15 percent—0 to trace stones, 0 to 5 percent cobbles, 0 to 10 percent pebbles.

Electrical conductivity: 0 to 2 mmhos/cm

Reaction: pH 6.6 to 7.8

The surface layer is crusted in the natural state and is also crusted where cultivated

Btn1 and Btn2 horizons

Hue: 10YR or 2.5Y

Value: 4, 5, or 6 dry; 3, 4, or 5 moist

Chroma: 2 or 3

Texture: clay loam, clay

Clay content: 35 to 50 percent

Structure: strong or medium columnar, prismatic, blocky

Rock fragments: 0 to 15 percent—0 to trace cobbles; 0 to 15 percent pebbles

Sodium adsorption ratio: 8 to 25

Electrical conductivity: 2 to 8 mmhos/cm

Reaction: pH 7.4 to 9.0

Pedons that have less than 15 percent ESP have more exchangeable Mg plus sodium than calcium, plus exchange acidity at pH 8.2

Bkn horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 2 or 3

Texture: clay loam, clay

Clay content: 30 to 45 percent

Rock fragments: 0 to 15 percent—0 to trace cobbles, 0 to 15 percent pebbles

Sodium adsorption ratio: 13 to 25

Electrical conductivity: 4 to 8 mmhos/cm

Reaction: pH 7.9 to 9.0

Bknyz horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 1, 2, or 3

Texture: loam, clay loam

Clay content: 25 to 40 percent

Rock fragments: 0 to 15 percent—0 to trace cobbles, 0 to 15 percent pebbles

Sodium adsorption ratio: 13 to 25

Electrical conductivity: 8 to 16 mmhos/cm

Reaction: pH 7.9 to 9.0

Bnyz horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5, 6, or 7 dry; 4 or 5 moist

Chroma: 1, 2, or 3

Texture: loam, clay loam

Clay content: 25 to 40 percent

Rock fragments: 0 to 15 percent—0 to trace cobbles, 0 to 15 percent pebbles

Sodium adsorption ratio: 13 to 25

Electrical conductivity: 8 to 16 mmhos/cm

Bulk density: 1.7 to 1.9 grams/cc

Reaction: pH 7.9 to 9.6

Elve Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Somewhat excessively drained
Permeability: Moderately rapid (2.0 to 6.0 inches/hour)
Landform: Mountains
Parent material: Colluvium from igneous rocks
Slope range: 25 to 70 percent
Annual precipitation: 18 to 22 inches
Annual air temperature: 38 to 42 degrees F
Frost-free period: 50 to 70 days

Taxonomic Class: Loamy-skeletal, mixed Typic
 Cryochrepts

Typical Pedon

Elve very cobbly loam, in an area of Elve-Rock outcrop complex, 25 to 70 percent slopes, in forest, 1,600 feet south and 1,600 feet east of the northwest corner of sec. 20, T. 20 N., R. 12 E.

Oi—2 inches to 0; slightly decomposed forest litter

E1—0 to 9 inches; brown (10YR 5/3) very cobbly loam, dark brown (10YR 4/3) moist; strong medium granular structure; soft, very friable, slightly sticky and nonplastic; many fine and medium and few coarse roots; 20 percent cobbles, 15 percent pebbles, and few stones; strongly acid; clear wavy boundary.

E2—9 to 18 inches; pale brown (10YR 6/3) very cobbly loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure parting to moderate fine granular; slightly hard, very friable, slightly sticky and nonplastic; common fine and medium and few coarse roots; many very fine tubular pores; 20 percent cobbles, 30 percent pebbles, and few stones; strongly acid; clear wavy boundary.

E3—18 to 28 inches; pale brown (10YR 6/3) extremely cobbly sandy loam, brown (10YR 5/3) moist; moderate fine granular structure; slightly hard, very friable, slightly sticky and nonplastic; common fine and medium roots; many very fine tubular pores; 25 percent cobbles, 35 percent pebbles; medium acid; gradual wavy boundary.

Bw—28 to 60 inches; grayish brown (10YR 5/2) extremely cobbly sandy loam, dark grayish brown (10YR 4/2) moist; moderate fine granular structure; slightly hard, very friable, nonsticky and nonplastic; few fine roots; many very fine tubular pores; 25 percent cobbles, 45 percent pebbles; medium acid.

Range in Characteristics

Content of clay in the control section: 10 to 20 percent
Rock fragments in the control section: 60 to 85 percent

E horizons

Hue: 7.5YR or 10YR
 Value: 6 or 7 dry, 4 or 5 moist
 Chroma: 2, 3, or 4
 Texture: loam, sandy loam
 Clay content: 10 to 20 percent
 Rock fragments: 35 to 85 percent—10 to 40 percent cobbles, 0 to 25 percent stones, 20 to 35 percent pebbles
 Reaction: pH 5.1 to 6.5
 Some pedons have an E/Bw horizon or EB horizon

Bw horizon

Hue: 7.5YR or 10YR
 Value: 5 or 6 dry, 4 or 5 moist
 Chroma: 2, 3, 4, or 6
 Texture: loam, sandy loam
 Clay content: 10 to 20 percent
 Rock fragments: 60 to 85 percent—35 to 40 percent cobbles and stones, 25 to 45 percent pebbles
 Reaction: pH 5.1 to 6.5

560F—Elve-Rock outcrop complex, 25 to 70 percent slopes

Setting

Landform:

- * Elve—Mountains
- * Rock outcrop—Mountains

Slope: 25 to 70 percent

Mean annual precipitation: 18 to 22 inches

Frost-free period: 50 to 70 days

Composition

Major Components

Elve and similar soils: 65 percent
 Rock outcrop: 20 percent

Minor Components

Ambrant and similar soils: 0 to 5 percent
 Soils shallow to bedrock: 0 to 3 percent
 Bouldery surface layers: 0 to 3 percent
 Moderately deep soils: 0 to 2 percent
 Slopes of 2 to 8 percent: 0 to 2 percent

Major Component Description

Elve

Surface layer texture: Very cobbly loam
Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Igneous colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 2.7 inches

Rock outcrop

Definition: Exposures of igneous bedrock

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Enbar Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Somewhat poorly drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Flood plains

Parent material: Alluvium

Slope range: 0 to 2 percent

Annual precipitation: 14 to 17 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 100 to 120 days

Taxonomic Class: Fine-loamy, mixed Cumulic
Haploborolls

Typical Pedon

Enbar loam, in an area of Enbar-Straw-Eagleton loams, 0 to 2 percent slopes, in hayland, 1,000 feet east and 2,100 feet south of the northwest corner of sec. 27, T. 22 N., R. 9 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; slightly effervescent; mildly alkaline; clear smooth boundary.

A2—6 to 18 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; strong fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine tubular pores; slightly effervescent; mildly alkaline; clear wavy boundary.

C—18 to 30 inches; grayish brown (10YR 5/2) stratified

loam and silt loam, dark grayish brown (10YR 4/2) moist; few fine faint yellowish brown (10YR 5/4) mottles; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine tubular pores; strongly effervescent; moderately alkaline; gradual wavy boundary.

Cg—30 to 52 inches; gray (5Y 5/1) stratified loam and silty clay loam, dark gray (5Y 4/1) moist; common fine faint brownish yellow (10YR 6/6) mottles; massive; hard, very friable, sticky and plastic; common very fine roots; many very fine tubular pores; few fine masses of lime; strongly effervescent; moderately alkaline; abrupt irregular boundary.

2C—52 to 60 inches; gray (10YR 5/1) very gravelly loamy sand, dark grayish brown (10YR 4/2) moist; single grain; loose, nonsticky and nonplastic; many fine and medium irregular pores; 40 percent pebbles; slightly effervescent; mildly alkaline.

Range in Characteristics

Mollic epipedon thickness: 16 to 28 inches

Content of clay in the control section: 18 to 30 percent

Depth to seasonal water table: 30 to 60 inches

Depth to the 2C horizon: 40 to 60 inches

Ap and A2 horizons

Hue: 5YR, 7.5YR, or 10YR

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 1, 2, 4, or 6

Clay content: 18 to 27 percent

Rock fragments: 0 to 15 percent pebbles

Effervescence: none to strongly

Reaction: pH 6.6 to 8.4

C horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 4, 5, or 6 dry; 4 or 5 moist

Chroma: 1 or 2

Mottles: few to common (Hue: 10YR 5/4 or 10YR 4/4)

Texture: loam or clay loam

Clay content: 18 to 30 percent

Rock fragments: 0 to 15 percent pebbles

Effervescence: strongly or violently

Reaction: pH 7.9 to 8.4

Cg horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 4, 5, or 6 dry; 4 or 5 moist

Chroma: 0, 1, or 2
 Mottles: few to common (Hue: 10YR 3/4, 10YR 5/6, or 10YR 6/6)
 Texture: loam with stratification of sandy loam, silty clay loam, and clay loam
 Clay content: 18 to 27 percent
 Rock fragments: 0 to 15 percent pebbles
 Effervescence: strongly or violently
 Reaction: pH 7.9 to 8.4

2C horizon

Hue: 10YR, 2.5Y, or 5Y
 Value: 4 to 6 dry, 4 or 5 moist
 Chroma: 1, 2, or 3
 Mottles: few to common (Hue: 10YR 6/6 or 10YR 5/6)
 Texture: sandy loam, loamy sand
 Clay content: 5 to 18 percent
 Rock fragments: 35 to 75 percent—0 to 5 percent cobbles, 35 to 70 percent pebbles
 Effervescence: strongly or violently
 Reaction: pH 7.9 to 8.4

493A—Enbar-Straw-Eagleton loams, 0 to 2 percent slopes

Setting

Landform:

- * Enbar—Flood plains
- * Straw—Flood plains
- * Eagleton—Flood plains

Slope:

- * Enbar—0 to 2 percent
- * Straw—0 to 2 percent
- * Eagleton—0 to 2 percent

Mean annual precipitation: 14 to 17 inches

Frost-free period: 100 to 120 days

Composition

Major Components

Enbar and similar soils: 35 percent
 Straw and similar soils: 30 percent
 Eagleton and similar soils: 20 percent

Minor Components

Nesda and similar soils: 0 to 5 percent
 Very gravelly loam soils: 0 to 3 percent
 Soils with sandy loam profiles: 0 to 3 percent
 Very gravelly sandy loam soils: 0 to 2 percent
 Slopes more than 2 percent: 0 to 2 percent

Major Component Description

Enbar

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Water table: Apparent
Available water capacity: Mainly 8.9 inches

Straw

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Available water capacity: Mainly 10.5 inches

Eagleton

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Poorly drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Water table: Apparent
Available water capacity: Mainly 10.6 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Ethridge Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Stream terraces, lake plains
Parent material: Glaciofluvial deposits, glaciolacustrine deposits, alluvium
Slope range: 0 to 4 percent
Annual precipitation: 11 to 14 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 105 to 125 days

Taxonomic Class: Fine, montmorillonitic Aridic Argiborolls

Typical Pedon

Ethridge silty clay loam, in an area of Ethridge-Kobase silty clay loams, 0 to 4 percent slopes, in cropland, 25 feet north and 1,650 feet east of the southwest corner of sec. 30, T. 23 N., R. 6 E.

Ap—0 to 6 inches; grayish brown (10YR 5/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate very fine and fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; neutral; abrupt smooth boundary.

Bt—6 to 14 inches; grayish brown (10YR 5/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; hard, friable, sticky and plastic; common very fine roots; many very fine tubular pores; common distinct clay films on faces of peds; neutral; clear wavy boundary.

Bk1—14 to 21 inches; light brownish gray (10YR 6/2) silty clay loam, dark grayish brown (10YR 4/2) moist; weak medium prismatic structure parting to weak fine and medium subangular blocky; hard, friable, sticky and plastic; common very fine roots; many very fine tubular pores; few faint clay films on faces of peds; few fine masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bk2—21 to 32 inches; light gray (2.5Y 7/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, friable, sticky and slightly plastic; few very fine roots; common very fine and few fine tubular pores; common fine masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

BCy—32 to 60 inches; light brownish gray (2.5Y 6/2) silty clay loam with strata of silt loam and silty clay below a depth of 42 inches, dark grayish brown (2.5Y 4/2) moist; massive; hard, friable, sticky and plastic; common very fine and few fine tubular pores; common fine masses of gypsum; slightly effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 14 inches and may include all or part of the Bt horizon

Content of clay in the control section: 35 to 45 percent
Depth to the Bk horizon: 10 to 20 inches

Ap horizon

Hue: 10YR or 2.5Y
Value: 2 or 3 moist
Chroma: 2 or 3
Texture: clay loam, silty clay loam
Clay content: 27 to 35 percent
Rock fragments: 0 to 5 percent pebbles
Reaction: pH 6.6 to 7.8

Bt horizon

Hue: 10YR or 2.5Y
Value: 3 or 4 moist
Chroma: 2, 3, or 4
Texture: clay, silty clay, clay loam, silty clay loam
Clay content: 35 to 45 percent
Rock fragments: 0 to 5 percent pebbles
Reaction: pH 6.6 to 7.8

Bk horizons

Hue: 10YR or 2.5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: clay, silty clay loam, loam, clay loam, silty clay
Clay content: 30 to 45 percent
Rock fragments: 0 to 5 percent pebbles
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.4 to 8.4

BCy horizon

Hue: 10YR or 2.5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: clay loam, silty clay loam (these textures consist of strata of finer and coarser materials)
Clay content: 27 to 40 percent slopes
Rock fragments: 0 to 5 percent
Electrical conductivity: 2 to 4 mmhos/cm
Gypsum content: 1 to 3 percent
Reaction: pH 7.4 to 8.4

381B—Ethridge clay loam, 0 to 4 percent slopes

Setting

Landform: Lake plains
Slope: 0 to 4 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Ethridge and similar soils: 85 percent

Minor Components

Evanston and similar soils: 0 to 10 percent

Kobase and similar soils: 0 to 3 percent

Loamy sand substratums: 0 to 2 percent

Major Component Description

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Glaciolacustrine deposits

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.8 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

38B—Ethridge silty clay loam, 0 to 4 percent slopes

Setting

Landform: Lake plains

Slope: 0 to 4 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Ethridge and similar soils: 85 percent

Minor Components

Kobase and similar soils: 0 to 5 percent

Evanston and similar soils: 0 to 3 percent

Acel and similar soils: 0 to 3 percent

Slopes more than 4 percent: 0 to 2 percent

Gerdrum and similar soils: 0 to 1 percent

Soils with sandy substratums: 0 to 1 percent

Major Component Description

Surface layer texture: Silty clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Glaciolacustrine deposits

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.8 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

386B—Ethridge-Evanston complex, 0 to 4 percent slopes

Setting

Landform:

* Ethridge—Stream terraces

* Evanston—Stream terraces

Position on landform:

* Ethridge—Footslopes and toeslopes

* Evanston—Backslopes and shoulders

Slope:

* Ethridge—0 to 2 percent

* Evanston—0 to 4 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Ethridge and similar soils: 45 percent

Evanston and similar soils: 40 percent

Minor Components

Kobase and similar soils: 0 to 10 percent

Degrad and similar soils: 0 to 3 percent

Chinook and similar soils: 0 to 2 percent

Major Component Description

Ethridge

Surface layer texture: Silty clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Glaciofluvial deposits

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.8 inches

Evanston

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Glaciofluvial deposits

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 10.1 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

385B—Ethridge-Kobase silty clay loams, 0 to 4 percent slopes

Setting

Landform:

* Ethridge—Lake plains

* Kobase—Lake plains

Position on landform:

* Ethridge—Footslopes and toeslopes

* Kobase—Backslopes and shoulders

Slope:

* Ethridge—0 to 2 percent

* Kobase—0 to 4 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Ethridge and similar soils: 55 percent

Kobase and similar soils: 30 percent

Minor Components

Linnet and similar soils: 0 to 5 percent

Acel and similar soils: 0 to 5 percent

Evanston and similar soils: 0 to 5 percent

Major Component Description

Ethridge

Surface layer texture: Silty clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Glaciolacustrine deposits

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.8 inches

Kobase

Surface layer texture: Silty clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Glaciolacustrine deposits

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.6 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

388A—Ethridge-Lonna silty clay loams, 0 to 2 percent slopes

Setting

Landform:

* Ethridge—Lake plains

* Lonna—Lake plains

Slope:

* Ethridge—0 to 2 percent

* Lonna—0 to 2 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Ethridge and similar soils: 55 percent

Lonna and similar soils: 35 percent

Minor Components

Evanston and similar soils: 0 to 5 percent

Yamacall and similar soils: 0 to 3 percent

Slopes more than 2 percent: 0 to 2 percent

Major Component Description

Ethridge

Surface layer texture: Silty clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained
Dominant parent material: Glaciolacustrine deposits
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.8 inches

Lonna

Surface layer texture: Silty clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciolacustrine deposits
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.3 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Evanston Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Alluvial fans, stream terraces, small drainageways
Parent material: Alluvium, glaciofluvial deposits
Slope range: 0 to 8 percent
Annual precipitation: 11 to 14 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 105 to 125 days

Taxonomic Class: Fine-loamy, mixed Aridic Argiborolls

Typical Pedon

Evanston loam, 0 to 4 percent slopes, in rangeland, 1,500 feet north and 1,600 feet west of the southeast corner of sec. 36, T. 26 N., R. 5 E.

A—0 to 6 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; strong fine and medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; neutral; clear wavy boundary.

Bt—6 to 14 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to strong fine and medium subangular blocky; hard, friable, sticky

and plastic; many very fine roots; many very fine and common fine tubular pores; many distinct clay films on faces of peds; mildly alkaline; clear wavy boundary.

Bk1—14 to 25 inches; light yellowish brown (2.5Y 6/4) clay loam, light olive brown (2.5Y 5/4) moist; weak medium prismatic structure parting to moderate fine and medium subangular blocky; hard, friable, sticky and plastic; common very fine roots; common very fine and few fine tubular pores; common fine masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk2—25 to 48 inches; light yellowish brown (2.5Y 6/2) clay loam, light olive brown (2.5Y 5/4) moist; weak medium subangular blocky structure; hard, friable, sticky and plastic; few very fine roots, common very fine and few fine tubular pores; many fine masses of lime and disseminated lime; violently effervescent; moderately alkaline; gradual wavy boundary.

BCK—48 to 60 inches; light yellowish brown (2.5Y 6/4) loam, olive brown (2.5Y 4/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; disseminated lime; violently effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 15 inches

Content of clay in the control section: 25 to 35 percent

Depth to the Bk horizon: 8 to 16 inches

A horizon

Hue: 2.5Y through 7.5YR

Value: 3, 4, or 5 dry; 2 or 3 moist

Chroma: 2 or 3 dry and moist

Reaction: pH 6.6 to 7.8

Bt horizon

Hue: 2.5Y through 7.5YR

Value: 3, 4, 5, or 6 dry; 3, 4, or 5 moist

Chroma: 2 through 4 dry and moist

Clay content: 25 to 35 percent

Reaction: pH 6.6 to 7.8

Bk and BCK horizons

Hue: 2.5Y through 7.5YR

Value: 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 3 or 4 dry and moist

Clay content: 15 to 35 percent

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.9 to 9.0

37B—Evanston loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans, stream terraces, and drainageways
Slope: 0 to 4 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Evanston and similar soils: 85 percent

Minor Components

Ethridge and similar soils: 0 to 3 percent
 Yamacall, calcareous soils: 0 to 3 percent
 Degrand and similar soils: 0 to 3 percent
 Evanston fine sandy loam: 0 to 2 percent
 Chinook and similar soils: 0 to 2 percent
 Marmarth and similar soils: 0 to 2 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 10.1 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

37C—Evanston loam, 4 to 8 percent slopes

Setting

Landform: Alluvial fans, stream terraces, and drainageways
Slope: 4 to 8 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Evanston and similar soils: 85 percent

Minor Components

Yamacall, calcareous soils: 0 to 5 percent
 Ethridge and similar soils: 0 to 3 percent
 Degrand and similar soils: 0 to 3 percent
 Chinook and similar soils: 0 to 2 percent
 Marmarth and similar soils: 0 to 2 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 10.1 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

377B—Evanston-Degrad loams, 0 to 4 percent slopes

Setting

Landform:
 * Evanston—Stream terraces
 * Degrand—Stream terraces
Position on landform:
 * Evanston—Footslopes and toeslopes
 * Degrand—Backslopes and shoulders
Slope:
 * Evanston—0 to 4 percent
 * Degrand—0 to 4 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Evanston and similar soils: 50 percent
 Degrand and similar soils: 35 percent

Minor Components

Chinook and similar soils: 0 to 5 percent
 Cozberg and similar soils: 0 to 10 percent

Major Component Description**Evanston**

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciofluvial deposits
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 10.1 inches

Degradand

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciofluvial deposits
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

375B—Evanston-Lonna loams, 0 to 4 percent slopes**Setting***Landform:*

- * Evanston—Stream terraces
- * Lonna—Stream terraces

Position on landform:

- * Evanston—Foothills and toeslopes
- * Lonna—Backslopes and shoulders

Slope:

- * Evanston—0 to 4 percent
- * Lonna—0 to 4 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition**Major Components**

Evanston and similar soils: 55 percent
 Lonna and similar soils: 30 percent

Minor Components

Evanston fine sandy loam: 0 to 10 percent
 Chinook and similar soils: 0 to 5 percent

Major Component Description**Evanston**

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciofluvial deposits
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.7 inches

Lonna

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciofluvial deposits
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 9.3 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

372C—Evanston-Yamacall loams, 2 to 8 percent slopes**Setting***Landform:*

- * Evanston—Alluvial fans
- * Yamacall—Alluvial fans

Slope:

- * Evanston—2 to 8 percent
- * Yamacall—2 to 8 percent

Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Evanston and similar soils: 55 percent
 Yamacall and similar soils: 30 percent

Minor Components

Degradand and similar soils: 0 to 5 percent
 Chinook and similar soils: 0 to 5 percent
 Marmarth and similar soils: 0 to 3 percent
 Delpoint and similar soils: 0 to 2 percent

Major Component Description

Evanston

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 10.1 inches

Yamacall

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 10.3 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Farnuf Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Alluvial fans, stream terraces, small drainageways, hills
Parent material: Alluvium
Slope range: 0 to 15 percent

Annual precipitation: 14 to 19 inches
Annual air temperature: 41 to 45 degrees F
Frost-free period: 90 to 120 days

Taxonomic Class: Fine-loamy, mixed Typic Argiborolls

Typical Pedon

Farnuf loam, 0 to 4 percent slopes, in cropland, 1,300 feet north and 500 feet east of the southwest corner of sec. 26, T. 21 N., R. 12 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; strong medium granular structure; soft, very friable, slightly sticky and slightly plastic; common fine and medium roots; neutral; abrupt smooth boundary.

Bt1—6 to 12 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; strong medium prismatic structure parting to strong medium subangular blocky; hard, friable, sticky and plastic; common fine roots; common very fine tubular pores; common distinct clay films on faces of peds; neutral; clear wavy boundary.

Bt2—12 to 18 inches; grayish brown (10YR 5/2) clay loam, brown (10YR 4/3) moist; moderate medium prismatic structure parting to strong fine and medium subangular blocky; hard, friable, sticky and plastic; few fine roots; many very fine tubular pores; common distinct clay films on faces of peds; mildly alkaline; clear wavy boundary.

Bk1—18 to 26 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; weak medium prismatic structure parting to moderate medium subangular blocky; hard, very friable, slightly sticky and slightly plastic; few fine roots; many very fine tubular pores; common fine masses of lime; strongly effervescent; moderately alkaline; clear wavy boundary.

Bk2—26 to 46 inches; light brownish gray (10YR 6/2) loam, grayish brown (10YR 5/2) moist; weak coarse prismatic structure parting to weak fine and medium subangular blocky; hard, very friable, slightly sticky and slightly plastic; few fine roots; many very fine tubular pores; common fine seams and masses of lime; violently effervescent; moderately alkaline, clear wavy boundary.

Bk3—46 to 60 inches; light brownish gray (10YR 6/2) loam, grayish brown (10YR 5/2) moist; weak

medium subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; many very fine tubular pores; few fine seams and masses of lime; strongly effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 15 inches and includes all or part of the Bt horizons

Content of clay in the control section: 25 to 35 percent

Depth to the Bk horizon: 10 to 25 inches

A horizon

Hue: 2.5Y or 10YR

Value: 3, 4, or 5 dry; 2 or 3 moist

Chroma: 2 or 3

Clay content: 15 to 27 percent

Rock fragments: 0 to 35 percent—0 to 20 percent cobbles and stones, 0 to 15 percent pebbles

Reaction: pH 6.1 to 7.8

Bt horizons

Hue: 2.5Y, 10YR, or 7.5YR

Value: 3, 4, 5, or 6 dry; 2, 3, or 4 moist

Chroma: 2, 3, or 4

Texture: loam, clay loam, silty clay loam

Clay content: 25 to 35 percent

Rock fragments: 0 to 15 percent pebbles

Reaction: pH 6.6 to 7.8

Some pedons have a thin Btk horizon

Bk horizons

Hue: 2.5Y, 10YR, or 7.5YR

Value: 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 2, 3, or 4

Texture: fine sandy loam, loam, silt loam, silty clay loam, clay loam

Clay content: 15 to 30 percent

Rock fragments: 0 to 15 percent pebbles

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.4 to 8.4

75B—Farnuf loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans, stream terraces, and drainageways

Slope: 0 to 4 percent

Mean annual precipitation: 14 to 17 inches

Frost-free period: 100 to 120 days

Composition

Major Components

Farnuf and similar soils: 85 percent

Minor Components

Savage and similar soils: 0 to 10 percent

Very gravelly substratums: 0 to 3 percent

Calcareous surface layers: 0 to 2 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

75C—Farnuf loam, 4 to 8 percent slopes

Setting

Landform: Alluvial fans

Slope: 4 to 8 percent

Mean annual precipitation: 14 to 17 inches

Frost-free period: 100 to 120 days

Composition

Major Components

Farnuf and similar soils: 85 percent

Minor Components

Savage and similar soils: 0 to 7 percent

Calcareous surface layers: 0 to 5 percent

Sandy loam substratums: 0 to 3 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

411D—Farnuf-Reeder loams, 4 to 15 percent slopes

Setting

Landform:

* Farnuf—Hills

* Reeder—Hills

Position on landform:

* Farnuf—Footslopes

* Reeder—Backslopes and shoulders

Slope:

* Farnuf—4 to 8 percent

* Reeder—8 to 15 percent

Mean annual precipitation: 15 to 19 inches

Frost-free period: 90 to 115 days

Composition

Major Components

Farnuf and similar soils: 50 percent

Reeder and similar soils: 40 percent

Minor Components

Cabba and similar soils: 0 to 2 percent

Tally and similar soils: 0 to 2 percent

Vebar and similar soils: 0 to 2 percent

Areas of rock outcrop: 0 to 2 percent

Cohagen and similar soils: 0 to 1 percent

Whitlash and similar soils: 0 to 1 percent

Major Component Description

Farnuf

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.4 inches

Reeder

Surface layer texture: Loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Interbedded sandstone and shale residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.6 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Ferd Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Slow (0.06 to 0.2 inch/hour)

Landform: Alluvial fans, stream terraces

Parent material: Alluvium, glaciofluvial deposits

Slope range: 0 to 8 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Fine, montmorillonitic Glossic Eutroboralfs

Typical Pedon

Ferd loam, 0 to 2 percent slopes, in rangeland, 2,100 feet south and 1,200 feet east of the northwest corner of sec. 21, T. 27 N., R. 5 E.

A—0 to 3 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; weak thin platy structure parting to moderate fine granular; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; neutral; abrupt smooth boundary.

E/Bt—3 to 6 inches; E part (60 percent) light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; B part (40 percent) brown (10YR 5/3) silty clay loam, dark brown (10YR 4/3) moist; moderate medium platy structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine tubular pores; few faint clay films on faces of peds; neutral; abrupt smooth boundary.

Bt—6 to 13 inches; brown (10YR 5/3) silty clay loam, dark brown (10YR 4/3) moist; moderate fine and medium prismatic structure parting to moderate medium subangular blocky; very hard, friable, sticky and plastic; many very fine and fine roots; common very fine tubular pores; many faint clay films on faces of peds; neutral; clear wavy boundary.

Bk1—13 to 20 inches; light brownish gray (10YR 6/2) silty clay loam, dark grayish brown (10YR 4/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; very hard, friable, sticky and plastic; common very fine and fine roots; many very fine tubular pores; few fine masses of lime; strongly effervescent; moderately alkaline; clear wavy boundary.

Bk2—20 to 32 inches; light brownish gray (2.5Y 6/2) silty clay loam, grayish brown (2.5Y 5/2) moist; weak fine and medium subangular blocky structure; hard, firm, sticky and plastic; few very fine roots; common very fine tubular pores; common fine masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bck—32 to 60 inches; light yellowish brown (2.5Y 6/4) silty clay loam, light olive brown (2.5Y 5/4) moist; massive; hard, firm, sticky and plastic; few very fine roots; common very fine and few fine tubular pores; few fine seams of lime; strongly effervescent; strongly alkaline.

Range in Characteristics

Content of clay in the control section: 35 to 50 percent
Depth to the Bk horizon: 12 to 16 inches

A horizon

Hue: 10YR or 2.5Y
 Value: 3 or 4 moist
 Clay content: 20 to 27 percent
 Reaction: pH 6.6 to 7.3

E/Bt horizon

Hue: 10YR or 2.5Y
 Texture: loam, clay loam, silty clay loam
 Clay content: 22 to 35 percent
 Reaction: pH 6.6 to 7.8

Bt horizon

Hue: 10YR or 2.5Y
 Value: 5 or 6 dry
 Chroma: 2 or 3
 Texture: clay loam, silty clay loam, clay
 Clay content: 35 to 50 percent

Electrical conductivity: less than 2 mmhos/cm
 Reaction: pH 6.6 to 8.4

Bk1 and Bk2 horizons

Hue: 10YR or 2.5Y
 Value: 6 or 7 dry, 4 or 5 moist
 Chroma: 2 or 3
 Texture: clay loam, silty clay loam
 Clay content: 27 to 40 percent
 Calcium carbonate equivalent: 5 to 15 percent
 Sodium adsorption ratio: 0 to 13
 Electrical conductivity: 2 to 8 mmhos/cm
 Reaction: pH 7.9 to 9.0

Bck horizon

Hue: 10YR or 2.5Y
 Value: 5 or 6 dry, 4 or 5 moist
 Chroma: 2, 3, or 4
 Texture: clay loam, silty clay loam
 Clay content: 27 to 40 percent
 Calcium carbonate equivalent: 5 to 15 percent
 Sodium adsorption ratio: 8 to 13
 Electrical conductivity: 4 to 8 mmhos/cm
 Reaction: pH 7.9 to 9.6

31A—Ferd loam, 0 to 2 percent slopes

Setting

Landform: Stream terraces
Slope: 0 to 2 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Ferd and similar soils: 85 percent

Minor Components

Ethridge and similar soils: 0 to 5 percent
 Creed and similar soils: 0 to 5 percent
 Gerdrum and similar soils: 0 to 3 percent
 Absher and similar soils: 0 to 2 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciofluvial deposits
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.5 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

311B—Ferd-Creed-Gerdrum complex, 0 to 4 percent slopes

Setting

Landform:

- * Ferd—Alluvial fans and stream terraces
- * Creed—Alluvial fans and stream terraces
- * Gerdrum—Alluvial fans and stream terraces

Position on landform:

- * Ferd—Microhighs
- * Creed—Microhighs
- * Gerdrum—Microlows

Slope:

- * Ferd—0 to 4 percent
- * Creed—0 to 4 percent
- * Gerdrum—0 to 4 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Ferd and similar soils: 35 percent
 Creed and similar soils: 30 percent
 Gerdrum and similar soils: 20 percent

Minor Components

Ethridge and similar soils: 0 to 5 percent
 Absher and similar soils: 0 to 5 percent
 Evanston and similar soils: 0 to 2 percent
 Chinook and similar soils: 0 to 2 percent
 Sandy or gravelly substratum: 0 to 1 percent

Major Component Description

Ferd

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Glaciofluvial deposits

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.5 inches

Creed

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Glaciofluvial deposits

Native plant cover type: Rangeland

Flooding: None

Salt affected: Saline within 30 inches

Sodium affected: Sodic within 30 inches

Available water capacity: Mainly 6.5 inches

Gerdrum

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Glaciofluvial deposits

Native plant cover type: Rangeland

Flooding: None

Salt affected: Saline within 30 inches

Sodium affected: Sodic within 30 inches

Available water capacity: Mainly 6.1 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

311C—Ferd-Creed-Gerdrum complex, 4 to 8 percent slopes

Setting

Landform:

- * Ferd—Alluvial fans
- * Creed—Alluvial fans
- * Gerdrum—Alluvial fans

Position on landform:

- * Ferd—Microhighs
- * Creed—Microhighs
- * Gerdrum—Microlows

Slope:

- * Ferd—4 to 8 percent
- * Creed—4 to 8 percent
- * Gerdrum—4 to 8 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Ferd and similar soils: 35 percent
 Creed and similar soils: 30 percent
 Gerdrum and similar soils: 20 percent

Minor Components

Ethridge and similar soils: 0 to 5 percent
 Absher and similar soils: 0 to 5 percent
 Evanston and similar soils: 0 to 3 percent
 Chinook and similar soils: 0 to 2 percent

Major Component Description

Ferd

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.5 inches

Creed

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 6.5 inches

Gerdrum

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 6.1 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Flatcreek Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Somewhat poorly drained
Permeability: Very slow (<0.06 inch/hour)
Landform: Flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Annual precipitation: 14 to 17 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 100 to 120 days

Taxonomic Class: Fine, montmorillonitic (calcareous), frigid Vertic Ustifluvents

Typical Pedon

Flatcreek silty clay, in an area of Flatcreek-Nobe silty clays, 0 to 2 percent slopes, in rangeland, 2,300 feet south and 200 feet west of the northeast corner of sec. 9, T. 21 N., R. 12 E.

A—0 to 3 inches; grayish brown (10YR 5/2) silty clay, dark gray (10YR 4/1) moist; strong fine angular blocky structure; very hard, firm, very sticky and very plastic; many fine and very fine and few medium roots; mildly alkaline; clear smooth boundary.

By—3 to 11 inches; grayish brown (10YR 5/2) silty clay, dark gray (10YR 4/1) moist; weak medium prismatic structure parting to strong medium and coarse subangular blocky; extremely hard, firm, very sticky and very plastic; common fine and very fine roots; few fine and very fine tubular pores; few fine masses of gypsum; slightly effervescent; strongly alkaline; clear wavy boundary.

Byz—11 to 20 inches; grayish brown (10YR 5/2) silty clay, dark gray (10YR 4/1) moist; weak medium prismatic structure parting to strong medium subangular blocky; extremely hard, firm, very sticky and very plastic; common fine and very fine roots; few very fine tubular pores; few pressure faces; few fine masses of gypsum and other salts; slightly effervescent; moderately alkaline; clear wavy boundary.

BCyz1—20 to 43 inches; grayish brown (2.5Y 5/2) stratified clay and silty clay, dark grayish brown

(2.5Y 4/2) moist; massive; extremely hard, firm, very sticky and very plastic; few fine and very fine roots; common very fine tubular pores; common fine masses of gypsum and other salts; slightly effervescent; moderately alkaline; clear wavy boundary.

BCyz2—43 to 60 inches; light brownish gray (2.5Y 6/2) stratified clay and silty clay, grayish brown (2.5Y 5/2) moist; few fine faint light yellowish brown (2.5Y 6/4) mottles; massive; extremely hard, firm, very sticky and very plastic; few very fine tubular pores; few fine masses of gypsum and other salts; slightly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 40 to 60 percent

Depth to water table: 42 to 60 inches

Depth to the Byz horizon: 8 to 14 inches

A horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry, 4 moist

Chroma: 1 or 2

Clay content: 40 to 60 percent

Electrical conductivity: 0 to 4

Sodium adsorption ratio: 0 to 4

Reaction: pH 7.4 to 8.4

By horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 1 or 2

Texture: silty clay or clay

Clay content: 40 to 60 percent

Gypsum content: 0.5 to 1 percent

Electrical conductivity: 2 to 8

Sodium adsorption ratio: 4 to 13

Calcium carbonate equivalent: 1 to 3 percent

Reaction: pH 7.9 to 9.0

Byz horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 1 or 2

Texture: silty clay, clay

Clay content: 40 to 60 percent

Gypsum content: 0.5 to 1 percent

Electrical conductivity: 8 to 16

Sodium adsorption ratio: 4 to 13

Calcium carbonate equivalent: 2 to 5 percent

Reaction: pH 7.9 to 9.0

BCyz horizons

Hue: 10YR or 2.5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2, 3, or 4

Mottles: few or common in lower part

Texture: stratified clay and silty clay

Clay content: 40 to 60 percent

Gypsum content: 0.5 to 2 percent

Electrical conductivity: 8 to 16

Sodium adsorption ratio: 4 to 13

Calcium carbonate equivalent: 2 to 5 percent

Reaction: pH 7.9 to 9.0

303A—Flatcreek-Nobe silty clays, 0 to 2 percent slopes

Setting

Landform:

* Flatcreek—Flood plains

* Nobe—Flood plains

Position on landform:

* Flatcreek—Microlows

* Nobe—Microhighs

Slope:

* Flatcreek—0 to 2 percent

* Nobe—0 to 2 percent

Mean annual precipitation: 14 to 17 inches

Frost-free period: 105 to 120 days

Composition

Major Components

Flatcreek and similar soils: 60 percent

Nobe and similar soils: 30 percent

Minor Components

Bigsag and similar soils: 0 to 5 percent

Sagedale and similar soils: 0 to 3 percent

Macar and similar soils: 0 to 2 percent

Major Component Description

Flatcreek

Surface layer texture: Silty clay

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: Occasional

Water table: Apparent

Salt affected: Saline within 30 inches

Available water capacity: Mainly 7.6 inches

Nobe

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Water table: Apparent
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 4.0 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Fleak Series

Depth class: Shallow (10 to 20 inches)
Drainage class: Excessively drained
Permeability: Rapid (6.0 to 20.0 inches/hour)
Landform: Hills, escarpments
Parent material: Residuum from sandstone
Slope range: 8 to 70 percent
Annual precipitation: 11 to 14 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 105 to 125 days

Taxonomic Class: Mixed, frigid, shallow Aridic
 Ustipsamments

Typical Pedon

Fleak loamy fine sand, in an area of Fleak-Twilight-Rock outcrop complex, 25 to 70 percent slopes, in woodland, 825 feet west and 500 feet north of the southeast corner of sec. 25, T. 24 N., R. 16 E.

A—0 to 3 inches; grayish brown (2.5Y 5/2) loamy fine sand, dark grayish brown (2.5Y 4/2) moist; weak very fine and fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; strongly effervescent; neutral; clear smooth boundary.

C1—3 to 10 inches; light yellowish brown (2.5Y 6/4) loamy fine sand, light olive brown (2.5Y 5/4) moist; weak medium prismatic structure parting to weak fine subangular blocky; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; strongly effervescent; mildly alkaline; clear smooth boundary.

C2—10 to 18 inches; light brownish gray (2.5Y 6/2) loamy fine sand, light olive brown (2.5Y 5/4) moist; weak medium platy structure; slightly hard, very friable, nonsticky and nonplastic; common very fine roots and few fine roots; strongly effervescent; moderately alkaline; abrupt smooth boundary.

Cr—18 to 60 inches; pale yellow (2.5Y 7/4) sandstone, light olive brown (2.5Y 5/4) moist; strongly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 0 to 15 percent

Depth to the Cr horizon: 10 to 20 inches

A horizon

Hue: 10YR, 7.5YR, or 2.5Y
 Value: 4, 5, or 6 dry; 3, 4, or 5 moist
 Chroma: 2 or 3
 Clay content: 0 to 15 percent
 Reaction: pH 6.6 to 7.8

C horizons

Hue: 10YR or 2.5Y
 Value: 5 or 6 dry, 4 or 5 moist
 Chroma: 2, 3, or 4
 Texture: fine sand, loamy fine sand
 Clay content: 0 to 15 percent
 Reaction: pH 6.6 to 8.4

654F—Fleak-Twilight-Rock outcrop complex, 25 to 70 percent slopes**Setting***Landform:*

- * Fleak—Escarpments
- * Twilight—Hills
- * Rock outcrop—Escarpments

Position on landform:

- * Fleak—Shoulders and summits
- * Twilight—Backslopes and footslopes
- * Rock outcrop—Shoulders and summits

Slope:

- * Fleak—25 to 70 percent
- * Twilight—25 to 45 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition**Major Components**

Fleak and similar soils: 35 percent

Twilight and similar soils: 30 percent
Rock outcrop: 20 percent

Minor Components

Busby and similar soils: 0 to 4 percent
Yetull and similar soils: 0 to 3 percent
Delpoint and similar soils: 0 to 3 percent
Cabbart and similar soils: 0 to 2 percent
Fleak soils in rangeland: 0 to 2 percent
Douglas-fir (eastern part): 0 to 1 percent

Major Component Description

Fleak

Surface layer texture: Loamy fine sand
Depth class: Shallow (10 to 20 inches)
Drainage class: Excessively drained
Dominant parent material: Sandstone residuum
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 1.2 inches

Twilight

Surface layer texture: Fine sandy loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Sandstone residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.2 inches

Rock outcrop

Definition: Exposures of sandstone bedrock

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

653F—Fleak-Twilight-Yetull complex, 25 to 70 percent slopes

Setting

Landform:

- * Fleak—Escarpments
- * Twilight—Hills
- * Yetull—Hills

Position on landform:

- * Fleak—Shoulders and summits
- * Twilight—Backslopes and footslopes
- * Yetull—Backslopes and footslopes

Slope:

- * Fleak—25 to 70 percent
- * Twilight—25 to 45 percent
- * Yetull—25 to 70 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Fleak and similar soils: 30 percent
Twilight and similar soils: 30 percent
Yetull and similar soils: 25 percent

Minor Components

Areas of rock outcrop: 0 to 3 percent
Bascovy and similar soils: 0 to 3 percent
Slopes of 8 to 25 percent: 0 to 3 percent
Yamacall and similar soils: 0 to 2 percent
Neldore and similar soils: 0 to 2 percent
Ponderosa pine (eastern part): 0 to 2 percent

Major Component Description

Fleak

Surface layer texture: Loamy fine sand
Depth class: Shallow (10 to 20 inches)
Drainage class: Excessively drained
Dominant parent material: Sandstone residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.2 inches

Twilight

Surface layer texture: Fine sandy loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Sandstone residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.2 inches

Yetull

Surface layer texture: Fine sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.2 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Fortbenton Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderately rapid (2.0 to 6.0 inches/hour) to 23 inches; below this depth slow (0.06 to 0.2 inch/hour)

Landform: Till plains, lake plains

Parent material: Eolian deposits over glacial till or lacustrine deposits

Slope range: 0 to 8 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Fine-loamy, mixed Aridic Haploborolls

Typical Pedon

Fortbenton fine sandy loam, 0 to 4 percent slopes, in cropland, 600 feet south and 10 feet east of the northwest corner of sec. 2, T. 28 N., R 10 E.

Ap—0 to 6 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; strong fine and very fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; neutral; abrupt smooth boundary.

Bw1—6 to 13 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine and few fine tubular pores; neutral; clear wavy boundary.

Bw2—13 to 23 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 4/3) moist; moderate

medium prismatic structure parting to moderate fine and medium subangular blocky; hard, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine and few fine tubular pores; few faint clay films on faces of peds; mildly alkaline; abrupt wavy boundary.

2Bk1—23 to 32 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium prismatic structure parting to moderate fine and medium subangular blocky; hard, friable, sticky and plastic; few very fine roots; many very fine and few fine tubular pores; many fine and medium masses of lime; violently effervescent; moderately alkaline; clear wavy boundary.

2Bk2—32 to 60 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, friable, sticky and plastic; few very fine roots; common very fine and few fine tubular pores; many fine and medium masses of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 15 inches

Content of clay in the control section: 18 to 30 percent

Depth to the 2Bk horizon: 15 to 30 inches

Ap horizon

Hue: 10YR or 2.5Y

Value: 4 or 5 dry

Chroma: 2 or 3

Clay content: 10 to 18 percent

Reaction: pH 6.6 to 7.8

Bw1 horizon

Hue: 10YR or 2.5Y

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2 or 3

Texture: fine sandy loam, sandy loam

Clay content: 10 to 18 percent

Reaction: pH 6.6 to 7.8

Bw2 horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry

Chroma: 2, 3, or 4

Texture: fine sandy loam, sandy loam

Clay content: 10 to 18 percent

Reaction: pH 6.6 to 7.8

2Bk horizons

Hue: 10YR or 2.5Y

Value: 6 or 7 dry, 4 or 5 moist
 Chroma: 2, 3, or 4
 Texture: clay loam, silty clay loam
 Clay content: 27 to 35 percent
 Electrical conductivity: 0 to 4 mmhos/cm
 Sodium adsorption ratio: 0 to 4
 Calcium carbonate equivalent: 5 to 15 percent
 Reaction: pH 7.9 to 9.0

361B—Fortbenton fine sandy loam, 0 to 4 percent slopes

Setting

Landform: Till plains
Slope: 0 to 4 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Fortbenton and similar soils: 85 percent

Minor Components

Chinook and similar soils: 0 to 10 percent
 Kremlin and similar soils: 0 to 3 percent
 Lonesome and similar soils: 0 to 2 percent

Major Component Description

Surface layer texture: Fine sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Eolian over till or lacustrine material
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.8 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

365B—Fortbenton-Chinook fine sandy loams, 0 to 6 percent slopes

Setting

Landform:

- * Fortbenton—Till plains and lake plains
- * Chinook—Till plains and lake plains

Slope:

- * Fortbenton—0 to 6 percent
- * Chinook—0 to 6 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Fortbenton and similar soils: 50 percent
 Chinook and similar soils: 35 percent

Minor Components

Kremlin and similar soils: 0 to 3 percent
 Lihen and similar soils: 0 to 3 percent
 Cozberg and similar soils: 0 to 3 percent
 Yetull and similar soils: 0 to 2 percent
 Lonna and similar soils: 0 to 2 percent
 Slopes more than 6 percent: 0 to 2 percent

Major Component Description

Fortbenton

Surface layer texture: Fine sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Eolian over till or lacustrine material
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.8 inches

Chinook

Surface layer texture: Fine sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Eolian deposits
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

368C—Fortbenton-Hillon complex, 2 to 8 percent slopes

Setting

Landform:

- * Fortbenton—Till plains
- * Hillon—Till plains

Position on landform:

- * Fortbenton—Backslopes and footslopes
- * Hillon—Backslopes and shoulders

Slope:

- * Fortbenton—2 to 8 percent
- * Hillon—2 to 8 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Fortbenton and similar soils: 50 percent
Hillon and similar soils: 35 percent

Minor Components

Chinook and similar soils: 0 to 8 percent
Lihen and similar soils: 0 to 3 percent
Slopes more than 8 percent: 0 to 3 percent
Very gravelly soils: 0 to 1 percent

Major Component Description

Fortbenton

Surface layer texture: Fine sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Eolian over till

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.8 inches

Hillon

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Till

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 10.0 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

563A—Fortbenton-Scobey fine sandy loams, 0 to 3 percent slopes

Setting

Landform:

- * Fortbenton—Till plains
- * Scobey—Till plains

Slope:

- * Fortbenton—0 to 3 percent
- * Scobey—0 to 3 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Fortbenton and similar soils: 50 percent
Scobey and similar soils: 35 percent

Minor Components

Scobey clay loam: 0 to 5 percent
Kevin and similar soils: 0 to 5 percent
Chinook and similar soils: 0 to 3 percent
Evanston and similar soils: 0 to 2 percent

Major Component Description

Fortbenton

Surface layer texture: Fine sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained
Dominant parent material: Eolian over till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.8 inches

Scobey

Surface layer texture: Fine sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.7 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Garlet Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Mountains
Parent material: Colluvium from igneous rocks
Slope range: 25 to 70 percent
Annual precipitation: 20 to 28 inches
Annual air temperature: 38 to 42 degrees F
Frost-free period: 50 to 70 days

Taxonomic Class: Loamy-skeletal, mixed Typic Cryochrepts

Typical Pedon

Garlet cobbly loam, in an area of Garlet-Elkner complex, 25 to 70 percent slopes, in forest, 2,600 feet east and 1,500 feet north of the southwest corner of sec. 12, T. 28 N., R. 15 E.

O—3 inches to 0; slightly decomposed forest litter.

E—0 to 12 inches; light brownish gray (10YR 6/2) cobbly loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure parting to moderate medium granular; slightly hard, very friable, slightly sticky and slightly plastic; common fine and medium and few coarse roots; many fine and very fine tubular pores; 15 percent cobbles, 15 percent pebbles; slightly acid; clear wavy boundary.

E/B1—12 to 26 inches; E part (80 percent) is pale brown (10YR 6/3) very cobbly loam, dark grayish brown (10YR 4/2) moist that surrounds the B part; B part (20 percent) is grayish brown (10YR 5/2) very cobbly loam, dark grayish brown (10YR 4/2) moist; texture mixed is very cobbly loam; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and common medium roots; many fine tubular pores; 20 percent cobbles, 30 percent pebbles; slightly acid; gradual wavy boundary.

E/B2—26 to 44 inches; E part (60 percent) is pale brown (10YR 6/3) extremely cobbly sandy loam, brown (10YR 4/3) moist that surrounds the B part; B part (40 percent) is grayish brown (10YR 5/2) very cobbly sandy loam, dark grayish brown (10YR 4/2) moist; texture mixed is very cobbly sandy loam; moderate fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many fine and very fine tubular pores; 30 percent cobbles, 40 percent pebbles; slightly acid; gradual wavy boundary.

B/E—44 to 60 inches; B part (75 percent) is brown (10YR 5/3) extremely cobbly sandy loam, dark brown (10YR 4/3) moist with interfingering of E part; E part (25 percent) is light yellowish brown (10YR 6/4) extremely cobbly sandy loam, dark yellowish brown (10YR 4/4) moist; texture mixed is extremely cobbly sandy loam; moderate fine and medium subangular blocky structure; slightly hard, very friable, nonsticky, and nonplastic; many very fine and fine tubular pores; 30 percent cobbles, 40 percent pebbles; slightly acid.

Range in Characteristics

Content of clay in the control section: 10 to 25 percent
Rock fragments in the control section: 40 to 80 percent

E horizon

Value: 5 or 6 dry, 4 or 5 moist
 Chroma: 1, 2, or 3
 Clay content: 10 to 25 percent
 Rock fragments: 15 to 60 percent—0 to 30 percent cobbles and stones, 5 to 45 percent pebbles
 Reaction: pH 5.6 to 6.5

E2 horizon

Hue: 10YR or 7.5YR
 Value: 5, 6, or 7 dry; 4, 5, or 6 moist
 Chroma: 2, 3, or 4
 Texture: loam, sandy loam
 Clay content: 10 to 25 percent
 Rock fragments: 35 to 85 percent—10 to 40

percent cobbles and stones, 25 to 60 percent pebbles

Reaction: pH 5.6 to 6.5

E/B horizons

Hue: E part 10YR or 7.5YR, B part 10YR or 7.5YR

Value: E part 5 or 6, B part 6 or 7, dry; E part 4 or 5, B part 4 or 5 moist

Chroma: 2, 3, 4

Texture: sandy clay loam, sandy loam, loam

Clay content: 10 to 25 percent

Rock fragments: 40 to 80 percent—15 to 40 percent cobbles and stones, 25 to 60 percent pebbles

Reaction: pH 5.6 to 7.3

B/E horizon

Hue: B part 10YR or 7.5YR, E part 10YR or 7.5YR

Value: B part 6 or 7, E part 5 or 6 dry; B part 4 or 5, E part 4 or 5 moist

Chroma: 2, 3, or 4

Texture: sandy clay loam, sandy loam, loam

Clay content: 10 to 25 percent

Rock fragments: 40 to 80 percent—15 to 40 percent cobbles and stones, 25 to 60 percent pebbles

Reaction: pH 5.6 to 7.3

Some pedons have E/B horizons

580F—Garlet-Elkner complex, 25 to 70 percent slopes

Setting

Landform:

* Garlet—Mountains

* Elkner—Mountains

Position on landform:

* Garlet—Backslopes and footslopes

* Elkner—Backslopes and footslopes

Slope:

* Garlet—25 to 70 percent

* Elkner—25 to 45 percent

Mean annual precipitation: 20 to 28 inches

Frost-free period: 50 to 70 days

Composition

Major Components

Garlet and similar soils: 50 percent

Elkner and similar soils: 35 percent

Minor Components

Moderately deep soils: 0 to 5 percent

Very gravelly clay loam soils: 0 to 3 percent

Slopes less than 25 percent: 0 to 3 percent

Warwood and similar soils: 0 to 2 percent

Elve and similar soils: 0 to 2 percent

Major Component Description

Garlet

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Igneous colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.2 inches

Elkner

Surface layer texture: Sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Colluvium or residuum

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.8 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Gerber Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Slow (0.06 to 0.2 inch/hour)

Landform: Till plains, sedimentary plains, hills

Parent material: Glacial till or alluvium from shale

Slope range: 0 to 15 percent

Annual precipitation: 14 to 19 inches

Annual air temperature: 41 to 45 degrees F

Frost-free period: 90 to 120 days

Taxonomic Class: Fine, montmorillonitic, Vertic Argiborolls

Typical Pedon

Gerber silty clay, 0 to 4 percent slopes, in cropland, 1,200 feet east and 900 feet south of the northwest corner of sec. 24, T. 21 N., R. 6 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silty clay, very dark grayish brown (10YR 3/2) moist; strong medium granular structure; hard, friable, very sticky and very plastic; few very fine and fine roots; neutral; abrupt smooth boundary.

Bt1—7 to 11 inches; brown (10YR 4/3) silty clay, dark brown (10YR 3/3) moist; strong medium prismatic structure parting to strong fine and medium angular blocky; extremely hard, very firm, very sticky and very plastic; few very fine and fine roots; few very fine tubular pores; many distinct clay films on faces of peds; vertical cracks 1 to 2 inches wide when dry; mildly alkaline; clear wavy boundary.

Bt2—11 to 16 inches; brown (10YR 5/3) silty clay, brown (10YR 4/3) moist; strong medium prismatic structure parting to strong fine and medium subangular blocky; extremely hard, very firm, very sticky and very plastic; few fine and very fine roots; few very fine tubular pores; many distinct clay films on faces of peds; vertical cracks 1 to 2 inches wide when dry; mildly alkaline; gradual wavy boundary.

Btk—16 to 28 inches; brown (10YR 5/3) silty clay, brown (10YR 4/3) moist; moderate medium prismatic structure parting to strong fine and medium subangular blocky; very hard, very firm, very sticky and very plastic; few fine and very fine roots; few very fine tubular pores; common faint clay films on faces of peds in upper part; few pressure faces in lower part; common fine and medium masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bk—28 to 46 inches; pale brown (10YR 6/3) silty clay, dark grayish brown (2.5Y 4/2) moist; weak medium prismatic structure parting to moderate medium subangular blocky; very hard, very firm, very sticky and very plastic; few very fine tubular pores; few pressure faces in upper part; many fine and medium masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

BCK—46 to 60 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; massive; extremely hard, very firm, very sticky and very plastic; few very fine tubular pores; few fine masses of lime; strongly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 45 to 60 percent
Depth to the Btk or Bk horizon: 12 to 20 inches

Ap horizon

Value: 4 or 5 dry, 3 moist
 Chroma: 2 or 3
 Texture: silty clay, clay
 Clay content: 40 to 50 percent
 Reaction: pH 6.6 to 7.8

Bt1, Bt2, and Btk horizons

Value: 4 or 5 dry, 3 or 4 moist
 Chroma: 2 or 3
 Texture: silty clay, clay
 Clay content: 45 to 60 percent
 Reaction: pH 7.4 to 8.4

Bk and BCK horizons

Hue: 10YR or 2.5Y
 Value: 5 or 6 dry, 4 or 5 moist
 Chroma: 2 or 3
 Texture: silty clay, silty clay loam, clay loam, clay
 Clay content: 35 to 50 percent
 Calcium carbonate equivalent: 5 to 15 percent
 Reaction: pH 7.4 to 8.4

681C—Gerber clay, 4 to 8 percent slopes

Setting

Landform: Till plains
Slope: 4 to 8 percent
Mean annual precipitation: 14 to 17 inches
Frost-free period: 100 to 120 days

Composition

Major Components

Gerber and similar soils: 85 percent

Minor Components

Bearpaw and similar soils: 0 to 6 percent
 Vida and similar soils: 0 to 5 percent
 Waltham and similar soils: 0 to 2 percent
 Sunburst and similar soils: 0 to 2 percent

Major Component Description

Surface layer texture: Clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.6 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

68B—Gerber silty clay, 0 to 4 percent slopes

Setting

Landform: Till plains

Slope: 0 to 4 percent

Mean annual precipitation: 14 to 17 inches

Frost-free period: 100 to 120 days

Composition

Major Components

Gerber and similar soils: 85 percent

Minor Components

Calcareous surface layers: 0 to 5 percent

Bearpaw and similar soils: 0 to 4 percent

Savage and similar soils: 0 to 3 percent

Waltham and similar soils: 0 to 2 percent

Nishon and similar soils: 0 to 1 percent

Major Component Description

Surface layer texture: Silty clay

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Till

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.6 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Gerdrum Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Very slow (<0.06 inch/hour)

Landform: Alluvial fans, stream terraces, small drainageways

Parent material: Alluvium, glaciofluvial deposits

Slope range: 0 to 8 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Fine, montmorillonitic Typic Natriboralfs

Typical Pedon

Gerdrum clay loam, in an area of Ferd-Creed-Gerdrum complex, 0 to 4 percent slopes, in rangeland, 2,000 feet west and 1,500 feet south of the northeast corner of sec. 20, T. 27 N., R. 5 E.

E—0 to 3 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; weak thin and very thin platy structure parting to weak very fine granular; soft, very friable, slightly sticky and slightly plastic; many fine and very fine roots; neutral; abrupt smooth boundary.

Btn1—3 to 6 inches; brown (10YR 5/3) clay, dark brown (10YR 4/3) moist; strong fine and medium columnar structure parting to strong fine subangular blocky; very hard, very firm, sticky and plastic; many fine and very fine roots; common very fine tubular pores; many distinct clay films on faces of peds; mildly alkaline; clear smooth boundary.

Btn2—6 to 11 inches; pale brown (10YR 6/3) clay, dark grayish brown (10YR 4/2) moist; moderate fine and medium prismatic structure parting to strong fine and medium subangular blocky; very hard, very firm, sticky and plastic; common fine and very fine roots; common very fine tubular pores; many faint clay films on faces of peds; slightly effervescent; moderately alkaline; clear wavy boundary.

Btnk—11 to 16 inches; light brownish gray (10YR 6/2) clay, dark grayish brown (10YR 4/2) moist; weak medium prismatic structure parting to moderate medium subangular blocky; very hard, firm, sticky and plastic; common very fine roots; common very fine tubular pores; few faint clay films on faces of peds; common fine masses of lime; violently effervescent; strongly alkaline; gradual wavy boundary.

Bknyz1—16 to 32 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, sticky and plastic; few

very fine roots; common very fine tubular pores; few fine masses of gypsum and other salts; few fine and medium masses of lime; strongly effervescent; strongly alkaline; gradual wavy boundary.

Bknyz2—32 to 42 inches; light yellowish brown (2.5Y 6/4) clay loam, olive brown (2.5Y 4/4) moist; massive; hard, firm, sticky and plastic; few fine roots; many very fine tubular pores; common fine seams and masses of gypsum and other salts; few fine masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bnyz—42 to 60 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, sticky and plastic; many very fine tubular pores; few medium masses of gypsum and other salts; strongly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 35 to 55 percent

Depth to the Btk horizon: 10 to 24 inches

Depth to the Bknyz1 horizon: 15 to 24 inches

E horizon

Hue: 10YR or 2.5Y

Value: 6 or 7 dry; 4, 5, or 6 moist

Chroma: 2 or 3

Clay content: 20 to 27 percent

Rock fragments: 0 to 15 percent pebbles

Reaction: pH 6.6 to 7.8

Btn1 horizon

Hue: 10YR or 2.5Y

Value: 5, 6, or 7 dry; 4 or 5 moist

Chroma: 2, 3, or 4

Texture: clay, silty clay, silty clay loam

Clay content: 35 to 55 percent

Rock fragments: 0 to 10 percent pebbles

Structure: fine to coarse columnar, or medium or coarse blocky

Hardness: extremely or very hard when dry

Electrical conductivity: 1 to 8 mmhos/cm

Sodium adsorption ratio: 10 to 20, pedons with sodium adsorption ratio of less than 13 have more exchangeable magnesium plus sodium than calcium plus exchange acidity at pH 8.2

Reaction: pH 7.4 to 9.0

Btn2 horizon

Hue: 10YR or 2.5Y

Value: 5, 6, or 7 dry; 4 or 5 moist

Chroma: 2, 3, or 4

Texture: clay, silty clay, silty clay loam

Clay content: 35 to 55 percent

Rock fragments: 0 to 10 percent pebbles

Structure: fine to coarse prismatic, or medium or coarse blocky

Hardness: extremely or very hard when dry

Electrical conductivity: 1 to 8 mmhos/cm

Sodium adsorption ratio: 10 to 20, pedons with sodium adsorption ratio of less than 13 have more exchangeable magnesium plus sodium than calcium plus exchange acidity at pH 8.2

Reaction: pH 7.4 to 9.0

Btnk horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 2 or 3

Texture: clay, silty clay, silty clay loam, clay loam

Clay content: 35 to 55 percent

Rock fragments: 0 to 10 percent pebbles

Calcium carbonate equivalent: 5 to 15 percent

Electrical conductivity: 2 to 8 mmhos/cm

Sodium adsorption ratio: 13 to 20

Reaction: pH 7.4 to 9.0

Bknyz and Bnyz horizons

Hue: 10YR, 2.5Y, or 5Y

Value: 4, 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 2, 3, or 4

Texture: clay loam, sandy clay loam, clay, silty clay

Clay content: 30 to 50 percent

Rock fragments: 0 to 10 percent pebbles

Calcium carbonate equivalent: 5 to 15 percent

Electrical conductivity: 8 to 16 mmhos/cm

Sodium adsorption ratio: 13 to 30

Gypsum content: 1 to 5 percent

Reaction: pH 7.9 to 9.0

402A—Gerdrum-Absher-Creed complex, 0 to 2 percent slopes

Setting

Landform:

* Gerdrum—Alluvial fans, stream terraces, and drainageways

* Absher—Alluvial fans, stream terraces, and drainageways

* Creed—Alluvial fans, stream terraces, and drainageways

Position on landform:

* Gerdrum—Microlows

* Absher—Microlows

* Creed—Microhighs

Slope:

- * Gerdrum—0 to 2 percent
- * Absher—0 to 2 percent
- * Creed—0 to 2 percent

Mean annual precipitation: 11 to 14 inches*Frost-free period:* 105 to 125 days**Composition****Major Components**

Gerdrum and similar soils: 40 percent
 Absher and similar soils: 25 percent
 Creed and similar soils: 20 percent

Minor Components

Strongly sodic surface layers: 0 to 5 percent
 Slopes more than 2 percent: 0 to 4 percent
 Ferd and similar soils: 0 to 3 percent
 Ethridge and similar soils: 0 to 2 percent
 Gravelly sandy loam substratum: 0 to 1 percent

Major Component Description**Gerdrum**

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciofluvial deposits
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 6.1 inches

Absher

Surface layer texture: Clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciofluvial deposits
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 4.1 inches

Creed

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciofluvial deposits
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches

Sodium affected: Sodic within 30 inches*Available water capacity:* Mainly 6.5 inches**Management**

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Glendive Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderately rapid (2.0 to 6.0 inches/hour)
Landform: Flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Annual precipitation: 11 to 14 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 105 to 125 days

Taxonomic Class: Coarse-loamy, mixed (calcareous), frigid Aridic Ustifluvents

Typical Pedon

Glendive sandy loam, in an area of Havre-Glendive complex, 0 to 1 percent slopes, in cropland, 1,500 feet east and 1,100 feet south of the northwest corner of sec. 9, T. 23 N., R. 7 E.

Ap—0 to 6 inches; grayish brown (2.5Y 5/2) sandy loam, dark grayish brown (2.5Y 4/2) moist; moderate very fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; slightly effervescent; mildly alkaline; abrupt smooth boundary.

C1—6 to 29 inches; light brownish gray (2.5Y 6/2) sandy loam, dark grayish brown (2.5Y 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine pores; slightly effervescent; moderately alkaline; gradual smooth boundary.

C2—29 to 60 inches; light brownish gray (2.5Y 6/2) stratified sandy loam, loam and loamy sand, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; many very fine pores; slightly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 5 to 18 percent

Ap horizon

Hue: 10YR, 2.5Y, or 5Y
 Value: 4, 5, or 6 dry; 3, 4, or 5 moist
 Chroma: 2 or 3
 Clay content: 5 to 15 percent
 Effervescence: none to violently
 Reaction: pH 6.6 to 8.4

C1 horizon

Hue: 10YR, 2.5Y, or 5Y
 Value: 5, 6, or 7 dry; 4, 5, or 6 moist
 Chroma: 2, 3, or 4
 Texture: loam, silt loam, sandy loam, fine sandy loam
 Clay content: 5 to 18 percent
 Rock fragments: 0 to 15 percent pebbles
 Effervescence: slightly to violently
 Reaction: pH 7.4 to 9.0

C2 horizon

Hue: 10YR, 2.5Y, or 5Y
 Value: 5, 6, or 7 dry; 4, 5, or 6 moist
 Chroma: 2, 3, or 4
 Texture: loam, silt loam, sandy loam, fine sandy loam
 Clay content: 5 to 18 percent
 Rock fragments: 0 to 15 percent pebbles
 Effervescence: slightly to violently
 Reaction: pH 7.4 or 9.0

81A—Glendive sandy loam, 0 to 2 percent slopes

Setting

Landform: Flood plains
Slope: 0 to 2 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Glendive and similar soils: 85 percent

Minor Components

Havre and similar soils: 0 to 6 percent
 Harlake and similar soils: 0 to 3 percent
 Moderately saline soils: 0 to 2 percent
 Gravelly sand substratum: 0 to 2 percent
 Somewhat poorly drained soils: 0 to 2 percent

Major Component Description

Surface layer texture: Sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Available water capacity: Mainly 8.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Hanly Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Somewhat excessively drained
Permeability: Rapid (6.0 to 20.0 inches/hour)
Landform: Flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Annual precipitation: 11 to 14 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 105 to 125 days

Taxonomic Class: Sandy, mixed, frigid Aridic Ustifluvents

Typical Pedon

Hanly loamy sand, in an area of Rivra-Hanly complex, 0 to 2 percent slopes, in woodland, 700 feet east and 700 feet south of the northwest corner of sec. 4, T. 25 N., R. 9 E.

A—0 to 5 inches; light brownish gray (10YR 6/2) loamy sand, dark grayish brown (10YR 4/2) moist; moderate thin platy structure; slightly hard, very friable, nonsticky and nonplastic; many fine and medium roots; strongly effervescent; mildly alkaline; abrupt smooth boundary.

C1—5 to 9 inches; pale brown (10YR 6/3) sand and coarse sand, brown (10YR 5/3) moist; single grain; loose, nonsticky and nonplastic; common fine roots; strongly effervescent; moderately alkaline; abrupt wavy boundary.

C2—9 to 40 inches; pale brown (10YR 6/3) fine sand and sand, dark grayish brown (10YR 4/2) moist; single grain; loose, nonsticky and nonplastic; few medium roots; contains strata of light brownish gray (10YR 6/2) loam; strongly effervescent; moderately alkaline; gradual wavy boundary.

C3—40 to 60 inches; light brownish gray (10YR 6/2) sand, brown (10YR 5/3) moist; single grain; loose, nonsticky and nonplastic; few fine roots; slightly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 0 to 10 percent

A horizon

Hue: 2.5Y or 10YR

Value: 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 2 or 3

Clay content: 5 to 10 percent

Reaction: pH 6.6 to 8.4

C horizon

Hue: 10YR, 2.5Y, or 5YR

Value: 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 2 to 4

Clay content: 5 to 10 percent

Reaction: pH 6.6 to 8.4

Harlake Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Slow (0.06 to 0.2 inch/hour)

Landform: Flood plains

Parent material: Alluvium

Slope range: 0 to 1 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Fine, montmorillonitic (calcareous), frigid Aridic Ustifluvents

Typical Pedon

Harlake silty clay, 0 to 1 percent slopes, in cropland, 1,100 feet south and 2,000 feet west of the northeast corner of sec. 33, T. 24 N., R. 8 E.

Ap—0 to 8 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; strong medium granular and subangular blocky structure;

hard, firm, very sticky and very plastic; common fine and medium roots; slightly effervescent; mildly alkaline; abrupt smooth boundary.

C1—8 to 28 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; massive; very hard, firm, very sticky and very plastic; common fine and medium roots; common very fine tubular pores; slightly effervescent; moderately alkaline; clear smooth boundary.

C2—28 to 48 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, very sticky and very plastic; common fine and very fine roots; common very fine tubular pores; strongly effervescent; moderately alkaline; gradual wavy boundary.

C3—48 to 60 inches; light brownish gray (2.5Y 6/2) loam consisting of strata of fine sandy loam and silty clay loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, friable, sticky and plastic; many very fine tubular pores; strongly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 35 to 60 percent

Ap horizon

Hue: 10YR or 2.5Y

Value: 4, 5, or 6 dry; 4 or 5 moist

Chroma: 2 or 3

Clay content: 40 to 55 percent

Effervescence: slightly or strongly

Reaction: pH 7.4 to 8.4

C1 horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 4, 5, 6, or 7 dry; 4 or 5 moist

Chroma: 2 or 3

Texture: clay, silty clay, or silty clay loam consisting of stratified layers of clay, silt loam, silty clay loam, and silty clay

Clay content: 35 to 60 percent

Effervescence: strongly or violently

Reaction: pH 7.4 to 8.4

C2 horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 4, 5, 6, or 7 dry; 4 or 5 moist

Chroma: 2 or 3

Texture: clay, silty clay, or silty clay loam consisting of stratified layers of clay, silt loam, silty clay loam, and silty clay

Clay content: 35 to 60 percent
 Effervescence: strongly or violently
 Reaction: pH 7.4 to 8.4

C3 horizon

Hue: 10YR, 2.5Y, or 5Y
 Value: 4, 5, 6, or 7 dry; 4 or 5 moist
 Chroma: 2 or 3
 Texture: silt loam, loam, clay loam, or fine sandy loam consisting of stratified layers of silty clay loam, silt loam, and fine sandy loam
 Clay content: 15 to 35 percent
 Effervescence: strongly or violently
 Reaction: pH 7.9 to 9.0

90A—Harlake silty clay, 0 to 1 percent slopes

Setting

Landform: Flood plains
Slope: 0 to 1 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Harlake and similar soils: 85 percent

Minor Components

Havre and similar soils: 0 to 5 percent
 Glendive and similar soils: 0 to 4 percent
 Areas that occasionally flood: 0 to 2 percent
 Somewhat poorly drained soils: 0 to 2 percent
 Poorly drained soils: 0 to 2 percent

Major Component Description

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Available water capacity: Mainly 9.2 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Havre Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Annual precipitation: 11 to 14 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 105 to 125 days

Taxonomic Class: Fine-loamy, mixed (calcareous), frigid Aridic Ustifluvents

Typical Pedon

Havre loam, in an area of Havre-Glendive complex, 0 to 1 percent slopes, in cropland, 1,200 feet south and 1,100 feet east of the northwest corner of sec. 12, T. 25 N., R. 9 E.

Ap—0 to 6 inches; grayish brown (2.5Y 5/2) loam, dark grayish brown (2.5Y 4/2) moist; weak thin platy structure parting to weak fine and very fine granular; soft, friable, nonsticky and nonplastic; many fine and medium roots; slightly effervescent; neutral; clear smooth boundary.

C1—6 to 35 inches; grayish brown (2.5Y 5/2) loam with strata of silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak coarse subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; many fine and medium roots; many very fine tubular pores; common fine threads of gypsum in silty clay loam strata; disseminated lime; strongly effervescent; moderately alkaline; clear smooth boundary.

C2—35 to 60 inches; grayish brown (2.5Y 5/2) loam with strata of fine sandy loam, dark grayish brown (2.5Y 4/2) moist; massive; soft, friable, slightly sticky and slightly plastic; disseminated lime; strongly effervescent; mildly alkaline.

Range in Characteristics

Content of clay in the control section: 18 to 35 percent
Soil phases: Rarely flooded, occasionally flooded

Ap horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry, 4 or 5 moist
 Chroma: 2 or 3
 Texture: loam, silty clay loam
 Clay content: 20 to 35 percent
 Effervescence: none to strongly
 Reaction: pH 6.6 to 7.8

C1 horizon

Hue: 10YR, 2.5Y, or 5Y
 Value: 5 or 6 dry, 4 or 5 moist
 Chroma: 2 or 3
 Texture: loam, silt loam, or clay loam which consist of strata of silt loam, fine sandy loam, silty clay loam, and clay loam
 Clay content: 18 to 35 percent
 Effervescence: slightly or strongly
 Reaction: pH 7.4 to 8.4

C2 horizon

Hue: 10YR, 2.5Y, or 5Y
 Value: 5 or 6 dry, 4 or 5 moist
 Chroma: 2 or 3
 Texture: loam, silt loam, or clay loam which consist of strata of silt loam, fine sandy loam, silty clay loam, and clay loam
 Clay content: 18 to 35 percent
 Effervescence: slightly or strongly
 Reaction: pH 7.4 to 8.4

60A—Havre loam, 0 to 2 percent slopes**Setting**

Landform: Flood plains
Slope: 0 to 2 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition**Major Components**

Havre and similar soils: 85 percent

Minor Components

Glendive and similar soils: 0 to 5 percent
 Harlake and similar soils: 0 to 3 percent
 Moderately saline soils: 0 to 2 percent
 Somewhat poorly drained soils: 0 to 2 percent
 Poorly drained soils: 0 to 2 percent
 Hanly and similar soils: 0 to 1 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Available water capacity: Mainly 9.7 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

602A—Havre silty clay loam, 0 to 1 percent slopes**Setting**

Landform: Flood plains
Slope: 0 to 1 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition**Major Components**

Havre and similar soils: 85 percent

Minor Components

Harlake and similar soils: 0 to 8 percent
 Glendive and similar soils: 0 to 3 percent
 Somewhat poorly drained soils: 0 to 2 percent
 Poorly drained soils: 0 to 2 percent

Major Component Description

Surface layer texture: Silty clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Available water capacity: Mainly 9.6 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

601A—Havre-Glendive complex, 0 to 1 percent slopes

Setting

Landform:

- * Havre—Flood plains
- * Glendive—Flood plains

Slope:

- * Havre—0 to 1 percent
- * Glendive—0 to 1 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Havre and similar soils: 50 percent
Glendive and similar soils: 35 percent

Minor Components

Harlake and similar soils: 0 to 5 percent
Areas that occasionally flood: 0 to 3 percent
Hanly and similar soils: 0 to 2 percent
Somewhat poorly drained soils: 0 to 2 percent
Poorly drained soils: 0 to 2 percent

Major Component Description

Havre

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: Rare

Available water capacity: Mainly 9.7 inches

Glendive

Surface layer texture: Sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: Rare

Available water capacity: Mainly 8.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

603A—Havre-Glendive complex, 0 to 2 percent slopes, occasionally flooded

Setting

Landform: (fig. 4)

- * Havre—Flood plains
- * Glendive—Flood plains

Slope:

- * Havre—0 to 2 percent
- * Glendive—0 to 2 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Havre and similar soils: 45 percent
Glendive and similar soils: 40 percent

Minor Components

Hanly and similar soils: 0 to 3 percent
Areas that frequently flood: 0 to 3 percent
Somewhat poorly drained soils: 0 to 3 percent
Poorly drained soils: 0 to 2 percent
Rivra and similar soils: 0 to 2 percent
Harlake and similar soils: 0 to 2 percent

Major Component Description

Havre

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Forest land

Flooding: Occasional

Available water capacity: Mainly 9.7 inches

Glendive

Surface layer texture: Sandy loam

Depth class: Very deep (more than 60 inches)



Figure 4. Typical area of Havre-Glendive complex, 0 to 2 percent slopes, occasionally flooded on the Marias River flood plain. Neldore-Rock outcrop complex, 25 to 70 percent slopes, is on the steep hills and escarpments in the background.

Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Forest land
Flooding: Occasional
Available water capacity: Mainly 8.2 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Hedoes Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour) to 20 inches; below this depth moderately rapid (2.0 to 6.0 inches/hour)

Landform: Alluvial fans, hills

Parent material: Alluvium

Slope range: 2 to 45 percent

Annual precipitation: 15 to 19 inches

Annual air temperature: 41 to 44 degrees F

Frost-free period: 90 to 110 days

Taxonomic Class: Coarse-loamy, mixed Pachic Haploborolls

Typical Pedon

Hedoes loam, in an area of Hedoes-Belain loams, 8 to 25 percent slopes, in rangeland, 2,100 feet south and 200 feet west of the northeast corner of sec. 29, T. 27 N., R. 16 E.

A—0 to 5 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; strong fine and medium granular structure; soft, very friable, slightly sticky and slightly plastic; many fine and very fine roots; neutral; clear wavy boundary.

Bw1—5 to 11 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; weak medium prismatic structure parting to moderate fine and medium subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; many very fine tubular pores; neutral; clear wavy boundary.

Bw2—11 to 20 inches; dark brown (10YR 4/3) sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium prismatic structure parting to moderate fine and medium subangular blocky; slightly hard, very friable, slightly sticky and nonplastic; common fine and very fine roots; many very fine tubular pores; neutral, clear wavy boundary.

Bw3—20 to 31 inches; brown (10YR 5/3) sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; common fine and very fine roots; many very fine tubular pores; 5 percent pebbles; neutral; gradual wavy boundary.

Bk—31 to 60 inches; grayish brown (10YR 5/2) gravelly sandy loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; many very fine tubular pores; 20 percent pebbles; few fine masses of lime; slightly effervescent; mildly alkaline.

Range in Characteristics

Mollic epipedon thickness: More than 16 inches

Content of clay in the control section: 5 to 18 percent

Depth to the Bk horizon: 30 to 40 inches

A horizons

Hue: 7.5YR, 10YR, or 2.5Y

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 2 or 3

Texture: loam, sandy loam

Clay content: 5 to 15 percent

Rock fragments: 0 to 25 percent—0 to 5 percent cobbles, 0 to 2 percent pebbles

Reaction: pH 6.6 to 7.3

Bw horizons

Hue: 7.5YR, 10YR, or 2.5Y

Value: 4 or 5 dry; 2, 3, or 4 moist

Chroma: 2 or 3

Texture: loam, sandy loam

Clay content: 5 to 18 percent

Rock fragments: 0 to 20 percent—0 to 10 percent cobbles, 0 to 10 percent pebbles

Reaction: pH 6.6 to 8.4

Bk horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 or 3

Texture: sandy loam, coarse sandy loam

Clay content: 0 to 10 percent

Rock fragments: 10 to 35 percent

Calcium carbonate equivalent: 5 to 10 percent

Reaction: pH 6.6 to 8.4

76C—Hedoes loam, 2 to 8 percent slopes

Setting

Landform: Alluvial fans

Slope: 2 to 8 percent

Mean annual precipitation: 15 to 19 inches

Frost-free period: 90 to 110 days

Composition

Major Components

Hedoes and similar soils: 85 percent

Minor Components

Farnuf and similar soils: 0 to 5 percent

Hedoes sandy loam: 0 to 5 percent

Gravelly sand substratum: 0 to 5 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 6.2 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

761C—Hedoes-Belain loams, 2 to 8 percent slopes

Setting

Landform:

- * Hedoes—Alluvial fans
- * Belain—Bedrock-floored plains

Position on landform:

- * Hedoes—Footslopes
- * Belain—Backslopes and shoulders

Slope:

- * Hedoes—2 to 8 percent
- * Belain—2 to 8 percent

Mean annual precipitation: 15 to 19 inches

Frost-free period: 90 to 110 days

Composition

Major Components

Hedoes and similar soils: 50 percent
Belain and similar soils: 40 percent

Minor Components

Whitlash and similar soils: 0 to 5 percent
Hedoes sandy loam: 0 to 3 percent
Belain sandy loam: 0 to 2 percent

Major Component Description

Hedoes

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 6.2 inches

Belain

Surface layer texture: Loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Igneous residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 3.7 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

761E—Hedoes-Belain loams, 8 to 25 percent slopes

Setting

Landform:

- * Hedoes—Hills
- * Belain—Hills

Position on landform:

- * Hedoes—Footslopes
- * Belain—Backslopes and shoulders

Slope:

- * Hedoes—8 to 15 percent
- * Belain—8 to 25 percent

Mean annual precipitation: 15 to 19 inches

Frost-free period: 90 to 110 days

Composition

Major Components

Hedoes and similar soils: 50 percent
Belain and similar soils: 35 percent

Minor Components

Whitlash and similar soils: 0 to 5 percent
Perma and similar soils: 0 to 5 percent
Hedoes sandy loam: 0 to 3 percent
Belain sandy loam: 0 to 2 percent

Major Component Description

Hedoes

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 6.2 inches

Belain

Surface layer texture: Loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained
Dominant parent material: Igneous residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.7 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Hillon Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Till plains, hills, escarpments
Parent material: Glacial till
Slope range: 2 to 70 percent
Annual precipitation: 11 to 14 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 105 to 125 days

Taxonomic Class: Fine-loamy, mixed (calcareous), frigid Aridic Ustorthents

Typical Pedon

Hillon loam, 25 to 60 percent slopes, in rangeland, 1,800 feet west and 800 feet north of the southeast corner of sec. 29, T. 27 N., R. 5 E.

A—0 to 4 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; moderate fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; strongly effervescent; mildly alkaline; clear smooth boundary.

Bk1—4 to 14 inches; pale brown (10YR 6/3) clay loam, brown (10YR 4/3) moist; weak medium prismatic structure parting to moderate fine and medium subangular blocky; hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine tubular pores; common fine and medium masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk2—14 to 24 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; moderate fine and medium subangular blocky

structure; hard, friable, sticky and plastic; common very fine and fine roots; many very fine tubular pores; common fine and medium masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

BCy—24 to 60 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, sticky and plastic; few very fine roots; common very fine tubular pores; 5 percent pebbles; few fine and medium masses of gypsum; strongly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 20 to 35 percent

A horizon

Hue: 10YR or 2.5Y
 Value: 5 or 6 dry, 4 or 5 moist
 Chroma: 2 or 3
 Clay content: 20 to 27 percent
 Rock fragments: 0 to 25 percent—0 to 10 percent cobbles and stones, 0 to 15 percent pebbles
 Calcium carbonate equivalent: 5 to 10 percent
 Effervescence: none to violently
 Reaction: pH 7.4 to 8.4

Bk horizons

Hue: 10YR, 2.5Y, or 5Y
 Value: 5, 6, or 7 dry; 4, 5, or 6 moist
 Chroma: 2, 3, or 4
 Texture: loam, clay loam
 Clay content: 20 to 35 percent with 25 to 35 percent fine and coarser sand
 Rock fragments: 0 to 15 percent pebbles
 Calcium carbonate equivalent: 5 to 15 percent
 Effervescence: strongly or violently
 Bulk density: 1.55 to 1.75 g/ccm
 Reaction: pH 7.9 to 9.0

BCy horizon

Hue: 10YR, 2.5Y, or 5Y
 Value: 5, 6, or 7 dry; 4, 5, or 6 moist
 Chroma: 2, 3, or 4
 Texture: loam or clay loam
 Clay content: 20 to 35 percent with 25 to 35 percent fine and coarser sand
 Rock fragments: 0 to 15 percent pebbles
 Bulk density: 1.55 to 1.75 g/ccm
 Effervescence: strongly to violently
 Reaction: pH 7.9 to 9.0

22F—Hillon loam, 25 to 60 percent slopes**Setting***Landform:* Hills*Slope:* 25 to 60 percent*Mean annual precipitation:* 11 to 14 inches*Frost-free period:* 105 to 125 days**Composition****Major Components**

Hillon and similar soils: 85 percent

Minor Components

Sunburst and similar soils: 0 to 5 percent

Cabbart and similar soils: 0 to 3 percent

Delpoint and similar soils: 0 to 3 percent

Yetull and similar soils: 0 to 2 percent

Fleak and similar soils: 0 to 1 percent

Bascovy and similar soils: 0 to 1 percent

Major Component Description*Surface layer texture:* Loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Till*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 10.0 inches**Management**

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

222D—Hillon-Delpoint loams, 8 to 25 percent slopes**Setting***Landform:*

* Hillon—Hills

* Delpoint—Hills

Position on landform:

* Hillon—Backslopes and shoulders

* Delpoint—Backslopes and footslopes

Slope:

* Hillon—8 to 25 percent

* Delpoint—8 to 25 percent

Mean annual precipitation: 11 to 14 inches*Frost-free period:* 105 to 125 days**Composition****Major Components**

Hillon and similar soils: 55 percent

Delpoint and similar soils: 30 percent

Minor Components

Joplin and similar soils: 0 to 10 percent

Cabbart and similar soils: 0 to 3 percent

Yawdim and similar soils: 0 to 2 percent

Major Component Description**Hillon***Surface layer texture:* Loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Till*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 10.0 inches**Delpoint***Surface layer texture:* Loam*Depth class:* Moderately deep (20 to 40 inches)*Drainage class:* Well drained*Dominant parent material:* Interbedded sandstone and shale residuum*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 4.9 inches**Management**

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

223E—Hillon-Fleak complex, 15 to 35 percent slopes

Setting

Landform:

- * Hillon—Hills
- * Fleak—Hills

Position on landform:

- * Hillon—Backslopes and shoulders
- * Fleak—Backslopes

Slope:

- * Hillon—15 to 35 percent
- * Fleak—15 to 35 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Hillon and similar soils: 55 percent
Fleak and similar soils: 30 percent

Minor Components

Twilight and similar soils: 0 to 5 percent
Areas of rock outcrop: 0 to 5 percent
Cabbart and similar soils: 0 to 3 percent
Delpoint and similar soils: 0 to 2 percent

Major Component Description

Hillon

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Till

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 10.0 inches

Fleak

Surface layer texture: Loamy fine sand

Depth class: Shallow (10 to 20 inches)

Drainage class: Excessively drained

Dominant parent material: Sandstone residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 1.2 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

227F—Hillon-Fleak-Rock outcrop complex, 25 to 70 percent slopes

Setting

Landform:

- * Hillon—Escarpments
- * Fleak—Escarpments
- * Rock outcrop—Escarpments

Position on landform:

- * Hillon—Backslopes and shoulders
- * Fleak—Backslopes
- * Rock outcrop—Backslopes

Slope:

- * Hillon—25 to 70 percent
- * Fleak—25 to 70 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Hillon and similar soils: 40 percent
Fleak and similar soils: 30 percent
Rock outcrop: 15 percent

Minor Components

Twilight and similar soils: 0 to 5 percent
Busby and similar soils: 0 to 5 percent
Cabbart and similar soils: 0 to 3 percent
Yawdim and similar soils: 0 to 2 percent

Major Component Description

Hillon

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Till

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 10.0 inches

Fleak

Surface layer texture: Loamy fine sand

Depth class: Shallow (10 to 20 inches)

Drainage class: Excessively drained

Dominant parent material: Sandstone residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 1.2 inches

Rock outcrop

Definition: Exposures of sandstone bedrock

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

224E—Hillon-Joplin loams, 8 to 25 percent slopes

Setting

Landform:

* Hillon—Hills

* Joplin—Hills

Position on landform:

* Hillon—Backslopes and shoulders

* Joplin—Backslopes and footslopes

Slope:

* Hillon—8 to 25 percent

* Joplin—8 to 15 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Hillon and similar soils: 50 percent

Joplin and similar soils: 40 percent

Minor Components

Telstad and similar soils: 0 to 8 percent

Very gravelly surface layers: 0 to 1 percent

Gravelly sand substratums: 0 to 1 percent

Major Component Description

Hillon

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Till

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 10.0 inches

Joplin

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Till

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

221E—Hillon-Kevin clay loams, 8 to 25 percent slopes

Setting

Landform:

* Hillon—Hills

* Kevin—Hills

Position on landform:

* Hillon—Backslopes and shoulders

* Kevin—Backslopes and footslopes

Slope:

* Hillon—8 to 25 percent

* Kevin—8 to 15 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Hillon and similar soils: 50 percent

Kevin and similar soils: 40 percent

Minor Components

Scobey and similar soils: 0 to 6 percent

Very cobbly surface layers: 0 to 2 percent

Cabbart and similar soils: 0 to 1 percent

Bascovy and similar soils: 0 to 1 percent

Major Component Description

Hillon

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.9 inches

Kevin

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.1 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

229E—Hillon-Lambeth complex, 15 to 35 percent slopes

Setting

Landform:

- * Hillon—Hills
- * Lambeth—Hills

Position on landform:

- * Hillon—Backslopes and footslopes
- * Lambeth—Backslopes and shoulders

Slope:

- * Hillon—15 to 35 percent
- * Lambeth—15 to 35 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Hillon and similar soils: 45 percent
 Lambeth and similar soils: 45 percent

Minor Components

Kevin and similar soils: 0 to 5 percent
 Sunburst and similar soils: 0 to 5 percent

Major Component Description

Hillon

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)

Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.9 inches

Lambeth

Surface layer texture: Silt loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciolacustrine deposits
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 11.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Joplin Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Till plains, hills
Parent material: Glacial till
Slope range: 0 to 15 percent
Annual precipitation: 11 to 14 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 105 to 125 days

Taxonomic Class: Fine-loamy, mixed Aridic
 Argiborolls

Typical Pedon

Joplin loam, in an area of Telstad-Joplin loams, 0 to 4 percent slopes, in cropland, 300 feet south and 100 feet west of the northeast corner of sec. 28, T. 26 N., R. 12 E.

Ap—0 to 6 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; few pebbles; neutral; abrupt smooth boundary.

Bt—6 to 9 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; hard, friable, slightly

sticky and slightly plastic; many very fine and fine roots; many very fine tubular pores; many faint clay films on faces of peds; few pebbles; neutral; abrupt smooth boundary.

Bk—9 to 21 inches; light brownish gray (2.5Y 6/2) loam, grayish brown (2.5Y 5/2) moist; moderate fine and medium prismatic structure parting to moderate fine and medium subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine and common fine tubular pores; few pebbles; many fine and medium masses of lime; violently effervescent; moderately alkaline; clear wavy boundary.

BCK—21 to 38 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; common very fine and few fine tubular pores; 5 percent pebbles; many fine masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

C—38 to 60 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; 10 percent pebbles; slightly effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 9 inches and may include all of the Bt horizon

Depth to the Bk horizon: Less than 10 inches

Ap horizon

Hue: 10YR or 2.5Y

Chroma: 2 or 3

Clay content: 10 to 27 percent

Rock fragments: 0 to 15 percent—0 to 5 percent cobbles, 0 to 10 percent pebbles

Effervescence: none to violently

Calcium carbonate equivalent: 0 to 5 percent

Reaction: pH 6.6 to 7.8

Bt horizon

Hue: 10YR or 2.5Y

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2 or 3

Texture: loam, clay loam

Clay content: 25 to 35 percent

Rock fragments: 0 to 15 percent pebbles

Reaction: pH 6.6 to 7.8

Bk and BCK horizons

Hue: 10YR or 2.5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 or 3

Texture: loam, clay loam

Clay content: 18 to 35 percent

Rock fragments: 0 to 35 percent pebbles

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.4 to 9.0

C horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 or 3

Texture: loam, clay loam

Clay content: 18 to 32 percent

Rock fragments: 0 to 35 percent pebbles

Bulk density: 1.6 to 1.8 gr/cm

Reaction: pH 7.4 to 8.4

421C—Joplin-Hillon loams, 2 to 8 percent slopes

Setting

Landform:

* Joplin—Till plains

* Hillon—Till plains

Position on landform:

* Joplin—Backslopes and footslopes

* Hillon—Backslopes and shoulders

Slope:

* Joplin—2 to 8 percent

* Hillon—2 to 8 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Joplin and similar soils: 55 percent

Hillon and similar soils: 30 percent

Minor Components

Telstad and similar soils: 0 to 10 percent

Chinook and similar soils: 0 to 2 percent

Slopes more than 8 percent: 0 to 2 percent

Nishon and similar soils: 0 to 1 percent

Major Component Description

Joplin

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.4 inches

Hillon

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 10.0 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Kenilworth Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour) to 12 inches; below this depth slow (0.06 to 0.2 inch/hour)
Landform: Till plains, lake plains
Parent material: Eolian over lacustrine deposits
Slope range: 0 to 3 percent
Annual precipitation: 11 to 14 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 105 to 125 days

Taxonomic Class: Fine-loamy, mixed Aridic Argiborolls

Typical Pedon

Kenilworth fine sandy loam, in an area of Kenilworth-Fortbenton fine sandy loams, 0 to 3 percent slopes, in cropland, 2,000 feet north and 1,400 feet west of the southeast corner of sec. 21, T. 28 N., R. 11 E.

Ap—0 to 5 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium granular

structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; neutral; abrupt smooth boundary.

Bt1—5 to 8 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist; weak coarse prismatic structure parting to weak medium subangular blocky; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine tubular pores; common faint clay films on faces of peds; neutral; clear smooth boundary.

Bt2—8 to 12 inches; brown (10YR 5/3) sandy clay loam, brown (10YR 4/3) moist; moderate medium and coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; many faint clay films on faces of peds; neutral; clear wavy boundary.

2Bt3—12 to 16 inches; brown (10YR 5/3) clay loam, brown (10YR 4/3) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; hard, friable, sticky and plastic; few very fine roots; many very fine tubular pores; many thin clay films on ped faces; neutral; gradual wavy boundary.

2Bk1—16 to 29 inches; light brownish gray (10YR 6/2) clay loam, grayish brown (10YR 5/2) moist; weak medium prismatic structure parting to moderate fine and medium subangular blocky; hard, friable, sticky and plastic; few very fine roots; many very fine tubular pores; many medium and coarse masses of lime; violently effervescent; mildly alkaline; gradual wavy boundary.

2Bk2—29 to 60 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; moderate fine and medium angular blocky structure; hard, firm, sticky and plastic; common very fine tubular pores; few fine masses of lime in the upper part; strongly effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 15 inches

Content of clay in the control section: 18 to 30 percent

Depth to the 2Bt horizon: 12 to 24 inches

Depth to the 2Bk horizon: 12 to 26 inches

Ap horizon

Value: 4 or 5 dry, 2 or 3 moist
 Chroma: 2 or 3
 Clay content: 5 to 18 percent
 Reaction: pH 6.6 to 7.8

Bt1 horizon

Value: 4 or 5 dry, 3 or 4 moist
 Chroma: 2 or 3
 Texture: fine sandy loam, sandy clay loam
 Clay content: 15 to 25 percent and more than 45 percent fine and coarser sand
 Reaction: pH 6.6 to 7.8

Bt2 horizon

Value: 4 or 5 dry, 3 or 4 moist
 Chroma: 2, 3, or 4
 Texture: sandy clay loam, fine sandy loam, loam
 Clay content: 18 to 30 percent and more than 45 percent fine and coarser sand
 Bulk density: 1.40 to 1.60 gr/cm
 Reaction: pH 6.6 to 7.8

2Bt3 horizon

Chroma: 3 or 4
 Texture: sandy clay loam, clay loam
 Clay content: 20 to 35 percent and 20 to more than 45 percent fine and coarser sand
 Bulk density: 1.40 to 1.60 gr/cm
 Reaction: pH 6.6 to 7.8

2Bk1 horizon

Hue: 10YR or 2.5Y
 Value: 5, 6, or 7 dry; 4 or 5 moist
 Chroma: 2, 3, or 4
 Texture: clay loam, silty clay loam
 Clay content: 27 to 35 percent
 Rock fragments: 0 to 5 percent pebbles
 Calcium carbonate equivalent: 5 to 15 percent
 Bulk density: greater than 1.6 gr/cm
 Reaction: pH 7.4 to 8.4
 A fine sandy loam Bk horizon is allowed above the discontinuity

2Bk2 horizon

Hue: 10YR or 2.5Y
 Value: 5 or 6 dry, 4 or 5 moist
 Chroma: 2, 3, or 4
 Texture: clay loam, silty clay loam
 Clay content: 27 to 35 percent
 Rock fragments: 0 to 5 percent pebbles
 Calcium carbonate equivalent: 5 to 15 percent
 Reaction: pH 7.9 to 9.0
 Some pedons have a 2Bky horizon

351B—Kenilworth-Fortbenton fine sandy loams, 0 to 3 percent slopes**Setting***Landform:*

- * Kenilworth—Till plains and lake plains
- * Fortbenton—Till plains and lake plains

Slope:

- * Kenilworth—0 to 3 percent
- * Fortbenton—0 to 3 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition**Major Components**

Kenilworth and similar soils: 50 percent
 Fortbenton and similar soils: 35 percent

Minor Components

Chinook and similar soils: 0 to 5 percent
 Lihen and similar soils: 0 to 5 percent
 Telstad and similar soils: 0 to 3 percent
 Evanston and similar soils: 0 to 2 percent

Major Component Description**Kenilworth**

Surface layer texture: Fine sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Eolian over till or lacustrine material

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 10.4 inches

Fortbenton

Surface layer texture: Fine sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Eolian over till or lacustrine material

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.8 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Kevin Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Slow (0.06 to 0.2 inch/hour)

Landform: Till plains, hills

Parent material: Glacial till

Slope range: 0 to 15 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Fine-loamy, mixed Aridic
Argiborolls

Typical Pedon

Kevin clay loam, in an area of Scobey-Kevin clay loams, 4 to 8 percent slopes, in cropland, 100 feet south and 1,100 feet east of the northwest corner of sec. 1, T. 23 N., R. 3 E.

Ap—0 to 6 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate very fine and fine granular structure; soft, friable, sticky and plastic; many very fine and fine roots; neutral; abrupt smooth boundary.

Bt—6 to 9 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate fine subangular blocky; hard, friable, sticky and plastic; many very fine and fine roots; common very fine tubular pores; many distinct clay films on faces of peds; neutral; clear wavy boundary.

Bk1—9 to 15 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium prismatic structure parting to moderate fine subangular blocky; hard, friable, sticky and plastic; many very fine and fine roots; many very fine tubular pores; few thin clay films on faces of peds; few medium masses of lime; slightly effervescent; moderately alkaline; clear wavy boundary.

Bk2—15 to 31 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium prismatic structure parting to moderate fine subangular blocky; hard, friable, sticky and plastic; few very fine and fine roots;

many very fine and fine tubular pores; many fine masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

BCky—31 to 60 inches; light yellowish brown (2.5Y 6/4) clay loam, olive brown (2.5Y 4/4) moist; massive; hard, firm, sticky and plastic; few very fine and fine tubular pores; few medium masses of lime and gypsum, slightly effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 12 inches and may include all of the Bt horizon

Content of clay in the control section: 27 to 35 percent

Depth to the Bk horizon: Less than 10 inches

Ap horizon

Hue: 10YR, 2.5Y, or 5Y

Chroma: 2 or 3

Clay content: 27 to 32 percent

Rock fragments: 0 to 60 percent—0 to 50 percent pebbles, 0 to 10 percent cobbles

Reaction: pH 6.6 to 7.8

Bt horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2 or 3

Texture: clay loam or clay

Clay content: 35 to 45 percent

Rock fragments: 0 to 15 percent

Reaction: pH 6.6 to 8.4

Bk horizons

Hue: 10YR, 2.5Y, or 5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 or 3

Clay content: 27 to 35 percent

Rock fragments: 0 to 15 percent pebbles

Bulk density: 1.6 to 1.8 gr/cm

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.4 to 8.4

BCky horizons

Hue: 10YR, 5Y, or 2.5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2, 3, or 4

Clay content: 27 to 35 percent

Rock fragments: 0 to 15 percent

Bulk density: 1.6 to 1.8 gr/cm

Calcium carbonate equivalent: 1 to 10 percent

Gypsum content: 0 to 2 percent

Reaction: pH 7.9 to 8.4

44B—Kevin clay loam, 0 to 4 percent slopes**Setting***Landform:* Till plains*Slope:* 0 to 4 percent*Mean annual precipitation:* 11 to 14 inches*Frost-free period:* 105 to 125 days**Composition****Major Components**

Kevin and similar soils: 85 percent

Minor Components

Scobey and similar soils: 0 to 8 percent

Hillon and similar soils: 0 to 6 percent

Nishon and similar soils: 0 to 1 percent

Major Component Description*Surface layer texture:* Clay loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Till*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 9.1 inches**Management**

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

442C—Kevin-Elloam clay loams, 2 to 8 percent slopes**Setting***Landform:*

* Kevin—Till plains

* Elloam—Till plains

Position on landform:

* Kevin—Backslopes and footslopes

* Elloam—Microlows

Slope:

* Kevin—2 to 8 percent

* Elloam—2 to 8 percent

Mean annual precipitation: 11 to 14 inches*Frost-free period:* 105 to 125 days**Composition****Major Components**

Kevin and similar soils: 60 percent

Elloam and similar soils: 25 percent

Minor Components

Hillon and similar soils: 0 to 9 percent

Tanna and similar soils: 0 to 3 percent

Bascovy and similar soils: 0 to 2 percent

Nishon and similar soils: 0 to 1 percent

Major Component Description**Kevin***Surface layer texture:* Clay loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Till*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 9.1 inches**Elloam***Surface layer texture:* Clay loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Till*Native plant cover type:* Rangeland*Flooding:* None*Salt affected:* Saline within 30 inches*Sodium affected:* Sodic within 30 inches*Available water capacity:* Mainly 6.6 inches**Management**

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

441C—Kevin-Hillon clay loams, 2 to 8 percent slopes**Setting***Landform:*

* Kevin—Till plains

* Hillon—Till plains

Position on landform:

- * Kevin—Backslopes and footslopes
- * Hillon—Backslopes and shoulders

Slope:

- * Kevin—2 to 8 percent
- * Hillon—2 to 8 percent

Mean annual precipitation: 11 to 14 inches*Frost-free period:* 105 to 125 days**Composition****Major Components**

Kevin and similar soils: 50 percent
 Hillon and similar soils: 35 percent

Minor Components

Scobey and similar soils: 0 to 10 percent
 Slopes less than 2 percent: 0 to 3 percent
 Very cobbly surface layers: 0 to 1 percent
 Nishon and similar soils: 0 to 1 percent

Major Component Description**Kevin**

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.1 inches

Hillon

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.9 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

444D—Kevin-Scobey clay loams, 8 to 15 percent slopes**Setting***Landform:*

- * Kevin—Hills
- * Scobey—Hills

Position on landform:

- * Kevin—Backslopes and shoulders
- * Scobey—Footslopes

Slope:

- * Kevin—8 to 15 percent
- * Scobey—8 to 15 percent

Mean annual precipitation: 11 to 14 inches*Frost-free period:* 105 to 125 days**Composition****Major Components**

Kevin and similar soils: 55 percent
 Scobey and similar soils: 30 percent

Minor Components

Hillon and similar soils: 0 to 7 percent
 Slopes more than 15 percent: 0 to 5 percent
 Very gravelly surface layers: 0 to 3 percent

Major Component Description**Kevin**

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.1 inches

Scobey

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.9 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Klayent Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Poorly drained

Permeability: Slow (0.06 to 0.2 inch/hour)

Landform: Flood plains

Parent material: Alluvium

Slope range: 0 to 1 percent

Annual precipitation: 14 to 17 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 100 to 120 days

Taxonomic Class: Fine, mixed (calcareous), frigid
Fluvaquentic Endoaquolls

Typical Pedon

Klayent clay loam, 0 to 1 percent slopes, in rangeland, 1,300 feet east and 800 feet south of the northwest corner of sec. 16, T. 21 N., R. 10 E.

A—0 to 6 inches; black (10YR 2/1) clay loam, dark gray (10YR 4/1) dry; strong fine granular structure; hard, friable, sticky and plastic; many fine and very fine roots; neutral; clear smooth boundary.

Bw—6 to 14 inches; very dark gray (10YR 3/1) clay loam, dark grayish brown (10YR 4/2) dry; few fine distinct brownish yellow (10YR 6/6) mottles; moderate fine and medium subangular blocky structure; very hard, firm, very sticky and very plastic; many fine and very fine roots; common very fine tubular pores; moderately alkaline; clear wavy boundary.

Bk—14 to 20 inches; dark gray (10YR 4/1) clay, gray (10YR 5/1) dry; many medium distinct brownish yellow (10YR 6/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; very hard, firm, very sticky and very plastic; common fine and very fine roots; common very fine tubular pores; common fine and medium masses of lime; strongly effervescent; moderately alkaline; clear wavy boundary.

Bkyg1—20 to 32 inches; dark gray (5Y 4/1) clay loam, light gray (5Y 6/1) dry; many medium prominent brownish yellow (10YR 6/6) mottles; weak medium prismatic structure parting to moderate fine and medium subangular blocky; very hard, firm, very sticky and very plastic; few fine and very fine roots; common very fine tubular pores; many fine

and few medium masses of lime; few fine masses of gypsum; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bkyg2—32 to 60 inches; dark gray (5Y 4/1) clay loam with strata of silty clay and sandy loam, light gray (5Y 6/1) dry; many distinct light yellowish brown (10YR 6/4) mottles; massive; very hard, firm, sticky and plastic; common very fine tubular pores; common fine and few medium masses of lime; few fine masses of gypsum; strongly effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 10 to 16 inches

Content of clay in the control section: 35 to 50 percent

Depth to water table: 12 to 36 inches

Depth to the Bk horizon: 12 to 20 inches

Ap horizon

Hue: 10YR or 2.5Y

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 1 or 2

Clay content: 27 to 40 percent

Reaction: pH 6.6 to 8.4

Bw horizon

Hue: 10YR to 5Y

Value: 4, 5, or 6 dry; 3 or 4 moist

Chroma: 1 or 2

Texture: silty clay loam, clay loam, clay

Clay content: 35 to 50 percent

Rock fragments: 0 to 5 percent pebbles

Reaction: pH 7.9 to 9.0

Bk and Bkyg horizons

Hue: 10YR to 5Y matrix, 10YR or 2.5Y mottles

Value: 4, 5, or 6 matrix, 6, 7, or 8 mottles dry; 3 or 4 matrix, 6 or 7 mottles moist

Chroma: 1 or 2 matrix, 2, 4, 6, or 8 mottles

Texture: silty clay loam, clay loam, clay

Clay content: 35 to 50 percent

Rock fragments: 0 to 5 percent pebbles

Calcium carbonate equivalent: 5 to 15 percent

Electrical conductivity: 2 to 8 mmhos/cm

Reaction: pH 7.9 to 9.0

140A—Klayent clay loam, 0 to 1 percent slopes

Setting

Landform: Flood plains

Slope: 0 to 1 percent

Mean annual precipitation: 14 to 17 inches
Frost-free period: 100 to 120 days

Composition

Major Components

Klayent and similar soils: 85 percent

Minor Components

Very poorly drained soils: 0 to 5 percent
 Very gravelly substratums: 0 to 5 percent
 Moderately well drained soils: 0 to 5 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Poorly drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Water table: Apparent
Available water capacity: Mainly 8.0 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Kobase Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Alluvial fans, stream terraces, small drainageways, lake plains, sedimentary plains
Parent material: Alluvium, glaciofluvial deposits, glaciolacustrine deposits
Slope range: 0 to 15 percent
Annual precipitation: 11 to 14 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 105 to 125 days

Taxonomic Class: Fine, montmorillonitic, frigid Aridic Ustochrepts

Typical Pedon

Kobase silty clay loam, 0 to 4 percent slopes, in cropland, 100 feet south and 2,400 feet east of the northwest corner of sec. 8, T. 24 N., R. 8 E.

Ap—0 to 6 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; strong medium granular structure; slightly hard, very friable, sticky and plastic; common very fine and fine roots; slightly effervescent; mildly alkaline; abrupt smooth boundary.

Bw—6 to 14 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; moderate fine and medium subangular blocky structure; very hard, friable, sticky and plastic; common very fine and fine roots; many very fine tubular pores; strongly effervescent; mildly alkaline; clear wavy boundary.

Bk—14 to 25 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium subangular blocky structure; very hard, friable, sticky and plastic; few very fine and fine roots; many very fine tubular pores; common fine seams of lime; strongly effervescent; moderately alkaline; clear wavy boundary.

By—25 to 46 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak fine and medium subangular blocky structure; sticky and plastic; many very fine tubular pores; many fine seams and common medium masses of gypsum; strongly effervescent; moderately alkaline; clear wavy boundary.

BCy—46 to 60 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; massive; very hard, friable, sticky and plastic; many very fine tubular pores; common fine seams of gypsum; slightly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 35 to 45 percent
Depth to the Bk horizon: 12 to 17 inches
Depth to the By horizon: 20 to 40 inches

Ap horizon

Hue: 10YR or 2.5Y
 Value: 5 or 6 dry, 4 or 5 moist
 Chroma: 2 or 3
 Texture: silty clay loam, clay loam
 Clay content: 35 to 40 percent
 Rock fragments: 0 to 5 percent pebbles
 Electrical conductivity: 0 to 2 mmhos/cm
 Reaction: pH 6.6 to 8.4

Bw horizon

Hue: 10YR, 2.5Y, or 5Y
 Value: 5 or 6 dry, 4 or 5 moist
 Chroma: 1, 2, 3, or 4
 Texture: silty clay loam, silty clay, clay
 Clay content: 35 to 45 percent
 Rock fragments: 0 to 5 percent pebbles
 Reaction: pH 7.4 to 8.4

Bk horizon

Hue: 10YR, 2.5Y, or 5Y
 Value: 5, 6, or 7 dry; 4, 5, or 6 moist
 Chroma: 1, 2, 3, or 4
 Texture: silty clay loam, silty clay, clay
 Clay content: 35 to 45 percent
 Rock fragments: 0 to 5 percent pebbles
 Calcium carbonate equivalent: 5 to 15 percent
 Reaction: pH 7.4 to 9.0

By and BCy horizons

Hue: 10YR, 2.5Y, or 5Y
 Value: 5, 6, or 7 dry; 4, 5, or 6 moist
 Chroma: 1, 2, 3, or 4
 Texture: silty clay loam, silty clay, clay
 Clay content: 35 to 45 percent
 Rock fragments: 0 to 5 percent pebbles
 Calcium carbonate equivalent: 5 to 15 percent
 Gypsum content: 1 to 5 percent
 Reaction: pH 7.9 to 9.0

32B—Kobase silty clay loam, 0 to 4 percent slopes**Setting**

Landform: Lake plains
Slope: 0 to 4 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition**Major Components**

Kobase and similar soils: 85 percent

Minor Components

Ethridge and similar soils: 0 to 5 percent
 Marias and similar soils: 0 to 3 percent
 Clay loam till substratums: 0 to 3 percent
 Lonna and similar soils: 0 to 2 percent
 Yamacall, calcareous soils: 0 to 2 percent

Major Component Description

Surface layer texture: Silty clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciolacustrine deposits
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.6 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

32C—Kobase silty clay loam, 4 to 8 percent slopes**Setting**

Landform: Alluvial fans, stream terraces, and drainageways
Slope: 4 to 8 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition**Major Components**

Kobase and similar soils: 85 percent

Minor Components

Lonna and similar soils: 0 to 5 percent
 Clay loam till substratums: 0 to 5 percent
 Ethridge and similar soils: 0 to 3 percent
 Yamacall, calcareous soils: 0 to 2 percent

Major Component Description

Surface layer texture: Silty clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciofluvial deposits
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.6 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

32D—Kobase silty clay loam, 8 to 15 percent slopes

Setting

Landform: Alluvial fans

Slope: 8 to 15 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Kobase and similar soils: 85 percent

Minor Components

Yamacall, calcareous soils: 0 to 7 percent

Slopes less than 8 percent: 0 to 5 percent

Ethridge and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Silty clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.6 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Kremlin Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Alluvial fans, stream terraces, small drainageways

Parent material: Glaciofluvial deposits

Slope range: 0 to 8 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Fine-loamy, mixed Aridic Haploborolls

Typical Pedon

Kremlin loam, 0 to 4 percent slopes, in rangeland, 1,050 feet west and 250 feet south of the northeast corner of sec. 14, T. 23 N., R. 16 E.

A—0 to 6 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure parting to strong very fine and fine granular; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; neutral; clear smooth boundary.

Bw—6 to 11 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; strong medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine and common fine tubular pores; mildly alkaline; clear smooth boundary.

Bk1—11 to 15 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; strong medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine and fine tubular pores; common fine masses of lime; slightly effervescent; mildly alkaline; gradual wavy boundary.

Bk2—15 to 30 inches; light gray (10YR 7/2) clay loam, light yellowish brown (10YR 6/4) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; disseminated lime; violently effervescent; moderately alkaline; gradual wavy boundary.

BCk—30 to 60 inches; pale yellow (2.5Y 7/4) loam, light olive brown (2.5Y 5/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; disseminated lime; violently effervescent; strongly alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 15 inches, in some pedons it includes all or part of the Bw horizon

Content of clay in the control section: 18 to 30 percent

Depth to the Bk horizon: 10 to 20 inches

A horizon

Hue: 10YR or 2.5Y
 Value: 2 or 3 moist
 Chroma: 2 or 3
 Clay content: 18 to 27 percent
 Rock fragments: 0 to 5 percent pebbles
 Reaction: pH 6.1 to 7.8

Bw horizon

Hue: 10YR or 2.5Y
 Value: 4, 5, or 6 dry; 4 or 5 moist
 Chroma: 2 or 3
 Texture: loam, clay loam
 Clay content: 18 to 30 percent
 Rock fragments: 0 to 5 percent pebbles
 Reaction: pH 6.6 to 7.8

Bk1 horizon

Hue: 10YR or 2.5Y
 Value: 5, 6, or 7 dry; 4, 5, or 6 moist
 Chroma: 2 or 3
 Texture: loam, clay loam
 Clay content: 18 to 30 percent
 Rock fragments: 0 to 5 percent pebbles
 Calcium carbonate equivalent: 5 to 15 percent
 Effervescence: strongly or violently
 Electrical conductivity: 0 to 2 mmhos/cm
 Reaction: pH 7.4 to 8.4

Bk2 and BCk horizons

Hue: 10YR, 2.5Y, or 5Y
 Value: 6, 7, or 8 dry; 4, 5, or 6 moist
 Chroma: 2, 3, or 4
 Texture: loam, clay loam
 Clay content: 18 to 30 percent
 Rock fragments: 0 to 5 percent pebbles
 Calcium carbonate equivalent: 3 to 12 percent
 Effervescence: strongly or violently
 Electrical conductivity: 0 to 4 mmhos/cm
 Reaction: pH 7.4 to 8.4

98B—Kremlin loam, 0 to 4 percent slopes**Setting**

Landform: Alluvial fans, stream terraces, and drainageways

Slope: 0 to 4 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition**Major Components**

Kremlin and similar soils: 85 percent

Minor Components

Ethridge and similar soils: 0 to 5 percent

Degrad and similar soils: 0 to 5 percent

Kremlin sandy loam: 0 to 3 percent

Chinook and similar soils: 0 to 2 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Glaciofluvial deposits

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 10.2 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

98C—Kremlin loam, 4 to 8 percent slopes**Setting**

Landform: Alluvial fans

Slope: 4 to 8 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition**Major Components**

Kremlin and similar soils: 85 percent

Minor Components

Yamacall, calcareous soils: 0 to 8 percent

Chinook and similar soils: 0 to 5 percent

Very gravelly surface layers: 0 to 2 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Glaciofluvial deposits

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 10.2 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Laceycreek Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Alluvial fans, stream terraces, drainageways, hills

Parent material: Alluvium from igneous rocks

Slope range: 2 to 25 percent

Annual precipitation: 17 to 24 inches

Annual air temperature: 40 to 44 degrees F

Frost-free period: 70 to 105 days

Taxonomic Class: Fine-loamy, mixed Pachic Udic Argiborolls

Typical Pedon

Laceycreek loam, 8 to 15 percent slopes, in cropland, 2,600 feet west and 2,000 feet south of the northeast corner of sec. 22, T. 21 N., R. 9 E.

Ap—0 to 5 inches; very dark gray (10YR 3/1) loam, black (10YR 2/1) moist; strong fine and medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and very fine roots; 10 percent pebbles; neutral; abrupt smooth boundary.

A2—5 to 18 inches; very dark gray (10YR 3/1) loam, black (10YR 2/1) moist; weak medium subangular blocky structure parting to strong medium granular; slightly hard, very friable, slightly sticky and slightly plastic; common fine and very fine roots; many very fine and few fine tubular pores; 5 percent pebbles; neutral; clear wavy boundary.

Bt1—18 to 26 inches; dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; weak medium prismatic structure parting to moderate fine and medium subangular blocky;

hard, very friable, sticky and plastic; few fine and very fine roots; many very fine and few fine tubular pores; common faint clay films on faces of peds; 5 percent pebbles; neutral; clear wavy boundary.

Bt2—26 to 44 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; weak medium prismatic structure parting to moderate fine and medium subangular blocky; hard, very friable, sticky and plastic; few fine and very fine roots; many very fine and few fine and medium tubular pores; common distinct clay films on faces of peds; 5 percent pebbles; neutral; gradual wavy boundary.

2BC—44 to 60 inches; dark grayish brown (10YR 4/2) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and few fine tubular pores; 15 percent pebbles; neutral.

Range in Characteristics

Mollic epipedon thickness: 16 to 60 inches

Content of clay in the control section: 24 to 35 percent

Rock fragments in the control section: 0 to 20 percent

Depth to the 2BC horizon: 40 inches or more

A1 horizon

Hue: 10YR, 2.5Y, or N

Value: 3 or 4 dry; 2, 3, or N moist

Chroma: 0 or 1

Clay content: 15 to 24 percent

Rock fragments: 0 to 15 percent—0 to 10 percent pebbles, 0 to 5 percent cobbles

Reaction: pH 6.1 to 7.3

A2 horizon

Hue: 10YR, 2.5Y, or N

Value: 3 or 4 dry, 2 or 3 moist

Clay content: 15 to 24 percent

Rock fragments: 0 to 15 percent—0 to 10 percent pebbles, 0 to 5 percent cobbles

Reaction: pH 6.1 to 7.3

Bt1 horizon

Hue: 10YR or 2.5Y

Value: 3, 4, or 5 dry; 3 moist

Chroma: 2 or 3

Texture: loam, clay loam

Clay content: 24 to 35 percent

Rock fragments: 0 to 10 percent—0 to 10 percent pebbles, 0 to 5 percent cobbles

Reaction: pH 6.1 to 7.3

Bt2 horizon

Hue: 10YR or 2.5Y

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2 or 3

Texture: loam, clay loam, sandy clay loam

Clay content: 20 to 35 percent

Rock fragments: 0 to 25 percent—0 to 20 percent pebbles, 0 to 5 percent cobbles

Reaction: pH 6.6 to 7.3

2BC horizon

Hue: 10YR or 2.5Y

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2 or 3

Texture: sandy loam, loam

Clay content: 5 to 20 percent

Rock fragments: 0 to 20 percent—0 to 15 percent pebbles, 0 to 5 percent cobbles

Reaction: pH 6.6 to 7.3

The Lacey Creek soil in map units 650D and 650F is a taxadjunct to the series because the mollic epipedon has a chroma of 2. It classifies as fine-loamy, mixed Pachic Argiborolls.

110C—Lacey Creek loam, 2 to 8 percent slopes

Setting

Landform: Alluvial fans*Slope:* 2 to 8 percent*Mean annual precipitation:* 17 to 22 inches*Frost-free period:* 90 to 105 days

Composition

Major Components

Lacey Creek and similar soils: 85 percent

Minor Components

Very gravelly substratum: 0 to 10 percent

Very cobbly surface layers: 0 to 5 percent

Major Component Description

Surface layer texture: Loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Alluvium*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 9.9 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

110D—Lacey Creek loam, 8 to 15 percent slopes

Setting

Landform: Alluvial fans*Slope:* 8 to 15 percent*Mean annual precipitation:* 17 to 22 inches*Frost-free period:* 90 to 105 days

Composition

Major Components

Lacey Creek and similar soils: 85 percent

Minor Components

Very gravelly substratum: 0 to 8 percent

Very cobbly surface layers: 0 to 5 percent

Soils with a clay subsoil: 0 to 2 percent

Major Component Description

Surface layer texture: Loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Alluvium*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 9.9 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

110E—Lacey Creek loam, 15 to 25 percent slopes

Setting

Landform: Alluvial fans*Slope:* 15 to 25 percent

Mean annual precipitation: 17 to 22 inches
Frost-free period: 90 to 105 days

Composition

Major Components

Laceycreek and similar soils: 85 percent

Minor Components

Very gravelly substratums: 0 to 10 percent
 Very cobbly surface layers: 0 to 3 percent
 Stony surface layers: 0 to 2 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.9 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

460—Laceycreek loam, 8 to 25 percent slopes, moist

Setting

Landform: Alluvial fans, stream terraces, and drainageways
Slope: 8 to 25 percent
Mean annual precipitation: 17 to 22 inches
Frost-free period: 90 to 105 days

Composition

Major Components

Laceycreek and similar soils: 85 percent

Minor Components

Hedoes and similar soils: 0 to 5 percent
 Belain and similar soils: 0 to 3 percent
 Laceycreek, cool soils: 0 to 3 percent
 Soils with a clay subsoil: 0 to 2 percent

Eagleton and similar soils: 0 to 2 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 9.9 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

650D—Laceycreek-Ambrant complex, 4 to 15 percent slopes

Setting

Landform:
 * Laceycreek—Alluvial fans and stream terraces
 * Ambrant—Alluvial fans and stream terraces
Slope:
 * Laceycreek—4 to 15 percent
 * Ambrant—4 to 15 percent
Mean annual precipitation: 18 to 24 inches
Frost-free period: 70 to 100 days

Composition

Major Components

Laceycreek and similar soils: 55 percent
 Ambrant and similar soils: 35 percent

Minor Components

Winkler and similar soils: 0 to 8 percent
 Areas that occasionally flood: 0 to 2 percent

Major Component Description

Laceycreek

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 10.0 inches

Ambrant

Surface layer texture: Sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Alluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.7 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

650F—Laceycreek-Eaglecreek loams, 15 to 45 percent slopes

Setting

Landform:

* Laceycreek—Hills

* Eaglecreek—Hills

Position on landform:

* Laceycreek—Footslopes

* Eaglecreek—Backslopes and shoulders

Slope:

* Laceycreek—15 to 25 percent

* Eaglecreek—25 to 45 percent

Mean annual precipitation: 18 to 24 inches

Frost-free period: 70 to 100 days

Composition

Major Components

Laceycreek and similar soils: 45 percent

Eaglecreek and similar soils: 40 percent

Minor Components

Slopes more than 45 percent: 0 to 5 percent

Winkler and similar soils: 0 to 3 percent

Ambrant and similar soils: 0 to 2 percent

Whitlash and similar soils: 0 to 2 percent

Lodgepole pine trees: 0 to 2 percent

Areas of rock outcrop: 0 to 1 percent

Major Component Description

Laceycreek

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 10.0 inches

Eaglecreek

Surface layer texture: Loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Igneous residuum

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.9 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Lambeth Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderately slow (0.2 to 0.6 inch/hour)

Landform: Hills, escarpments

Parent material: Glaciolacustrine deposits

Slope range: 8 to 70 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Fine-silty, mixed (calcareous), frigid
Aridic Ustorthents

Typical Pedon

Lambeth silt loam, 8 to 25 percent slopes, in rangeland, 1,250 feet west and 1,000 feet north of the southeast corner of sec. 15, T. 24 N., R. 7 E.

A—0 to 4 inches; grayish brown (2.5Y 5/2) silt loam, dark grayish brown (2.5Y 4/2) moist; weak fine granular structure; soft, very friable, sticky and plastic; many fine and common medium roots; few

pebbles on surface; strongly effervescent; mildly alkaline; clear smooth boundary.

- By1—4 to 14 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; strong thin platy structure; slightly hard, very friable, sticky and plastic; many fine and common medium roots; few very fine and fine tubular pores and common fine irregular pores; common medium masses of gypsum crystals between plates; strongly effervescent; mildly alkaline; clear wavy boundary.
- By2—14 to 20 inches; light brownish gray (2.5Y 6/2) and light gray (2.5Y 7/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; strong thin platy structure; hard, very friable, sticky and plastic; few fine roots; few very fine and fine tubular pores; common fine masses of gypsum crystals; strongly effervescent; moderately alkaline; gradual wavy boundary.
- C—20 to 60 inches; grayish brown (2.5Y 5/2), light brownish gray (2.5Y 6/2) and light gray (2.5Y 7/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; strong thin and medium laminar platy structure; hard, very friable, very sticky and very plastic; few very fine and fine tubular pores; few thin silty clay varves; few thin sandy loam varves below 40 inches; few fine masses of gypsum crystals in upper part; slightly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 20 to 35 percent

A horizon

Hue: 10YR, 2.5Y, or 5Y
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 2, 3, or 4
Clay content: 20 to 27 percent
Reaction: pH 6.6 to 8.4

By and C horizons

Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: silt loam or silty clay loam with thin bands of loam, fine sandy loam, or very fine sandy loam
Clay content: 20 to 35 percent
Gypsum content: 1 to 6 percent
Calcium carbonate equivalent: 5 to 15 percent
Effervescence: strongly or violently
Reaction: pH 7.9 to 9.0

15E—Lambeth silt loam, 8 to 25 percent slopes

Setting

Landform: Hills
Slope: 8 to 25 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Lambeth and similar soils: 85 percent

Minor Components

Sunburst and similar soils: 0 to 5 percent
Busby and similar soils: 0 to 5 percent
Moderately saline soils: 0 to 2 percent
Slopes more than 25 percent: 0 to 2 percent
Areas that occasionally flood: 0 to 1 percent

Major Component Description

Surface layer texture: Silt loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciolacustrine deposits
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 11.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

15F—Lambeth silt loam, 25 to 70 percent slopes

Setting

Landform: Escarpments
Slope: 25 to 70 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Lambeth and similar soils: 85 percent

Minor Components

Busby and similar soils: 0 to 5 percent
 Hillon and similar soils: 0 to 5 percent
 Bare, eroding soils: 0 to 5 percent

Major Component Description

Surface layer texture: Silt loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciolacustrine deposits
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 11.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Lardell Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Poorly drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Flood plains
Parent material: Alluvium
Slope range: 0 to 1 percent
Annual precipitation: 11 to 14 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 105 to 125 days

Taxonomic Class: Fine-loamy, mixed, frigid Aquollic Salorthids

Typical Pedon

Lardell silty clay, 0 to 1 percent slopes, in rangeland, 1,200 feet north and 1,100 feet east the southwest corner of sec. 16, T. 28 N., R. 13 E.

Az—0 to 4 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; weak fine and medium granular structure; very hard, friable, very sticky and very plastic; few very fine roots; common fine masses of salts; slightly effervescent; very strongly alkaline; clear smooth boundary.

Bz—4 to 12 inches; light brownish gray (2.5Y 6/2) silty clay, dark grayish brown (2.5Y 4/2) moist; weak fine subangular blocky structure; extremely hard,

firm, very sticky and very plastic; few very fine roots; common very fine tubular pores; many fine masses of salts when dry; slightly effervescent; very strongly alkaline; clear wavy boundary.

BCz1—12 to 38 inches; light brownish gray (2.5Y 6/2) silty clay, dark grayish brown (2.5Y 4/2) moist; massive; extremely hard, firm, very sticky and very plastic; few very fine tubular pores; many fine masses of salt when dry; slightly effervescent; strongly alkaline; gradual wavy boundary.

BCz2—38 to 60 inches; light yellowish brown (2.5Y 6/4) silty clay loam with strata of loam, silt loam, and fine sandy loam, olive brown (2.5Y 4/4) moist; massive; hard, friable, sticky and plastic; few very fine tubular pores; few to common fine masses of salt; slightly effervescent; strongly alkaline.

Range in Characteristics

Content of clay in the control section: 35 to 50 percent
Depth to seasonal water table: 12 to 36 inches
Depth to the salic horizon: Less than 30 inches

Az horizon

Hue: 10YR, 2.5Y, 5Y, or N
 Value: 5, 6, or 7 dry; 4, 5, or 6 moist
 Chroma: 1 or 2
 Clay content: 40 to 55 percent
 Electrical conductivity: 16 to 30 mmhos/cm
 Sodium adsorption ratio: 8 to 50
 Reaction: pH 7.9 to 10.0

Bz and BCz1 horizons

Hue: 10YR, 2.5Y, 5Y, or N
 Value: 5, 6, or 7 dry; 4, 5, or 6 moist
 Chroma: 1, 2, or 3
 Texture: silty clay loam, clay loam, silty clay, clay
 Clay content: 35 to 50 percent
 Electrical conductivity: 16 to 50 mmhos/cm
 Salt content: 2 to 3 percent
 Sodium adsorption ratio: 13 to 80
 Reaction: pH 8.5 to 10.0

BCz2 horizon

Hue: 10YR, 2.5Y, 5Y, or N
 Value: 5, 6, or 7 dry; 4, 5, or 6 moist
 Chroma: 1, 2, 3, or 4
 Texture: silty clay loam, clay loam, silty clay, or clay that is stratified with silt loam to fine sandy loam
 Clay content: 30 to 45 percent
 Electrical conductivity: 16 to 50 mmhos/cm
 Salt content: 1 to 2 percent
 Sodium adsorption ratio: 30 to 60

Reaction: pH 8.5 to 10.0

The Lardell soil in map unit 63 is a taxadjunct to the series because it has 35 to 60 percent clay in the particle-size control section. It classifies as fine, mixed, frigid Aquollic Salorthids.

63—Lardell silty clay, 0 to 1 percent slopes

Setting

Landform: Flood plains

Slope: 0 to 1 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Lardell and similar soils: 90 percent

Minor Components

Bigsag and similar soils: 0 to 5 percent

Poorly drained, ponded soils: 0 to 3 percent

Slightly saline soils: 0 to 2 percent

Major Component Description

Surface layer texture: Silty clay

Depth class: Very deep (more than 60 inches)

Drainage class: Poorly drained

Dominant parent material: Alluvium

Flooding: Rare

Water table: Apparent

Salt affected: Saline within 30 inches

Sodium affected: Sodic within 30 inches

Available water capacity: Mainly 4.8 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Libeg Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Mountains

Parent material: Colluvium from igneous rocks

Slope range: 25 to 70 percent

Annual precipitation: 20 to 28 inches

Annual air temperature: 38 to 42 degrees F

Frost-free period: 50 to 70 days

Taxonomic Class: Loamy-skeletal, mixed Argic Cryoborolls

Typical Pedon

Libeg cobbly loam, in a area of Libeg-Arrowpeak-Elkner complex, 25 to 70 percent slopes, in rangeland, 1,600 feet south and 150 feet east of the northwest corner of sec. 8, T. 20 N., R. 9 E.

A—0 to 8 inches; very dark grayish brown (10YR 3/2) cobbly loam, very dark brown (10YR 2/2) moist; strong fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many fine and very fine and few medium roots; 20 percent cobbles, 10 percent pebbles; slightly acid; clear wavy boundary.

Bt1—8 to 14 inches; grayish brown (10YR 5/2) very cobbly loam, dark grayish brown (10YR 4/2) moist; weak fine and medium subangular blocky structure parting to strong medium granular; hard, very friable, slightly sticky and slightly plastic; many fine and very fine and few medium roots; many very fine tubular pores; few faint clay films on faces of peds; 25 percent cobbles, 20 percent pebbles; slightly acid; clear wavy boundary.

Bt2—14 to 32 inches; brown (10YR 5/3) extremely cobbly clay loam, dark brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; very hard, friable, sticky and plastic; common fine and very fine and few medium roots; many very fine tubular pores; common faint clay films on faces of peds; 30 percent cobbles, 40 percent pebbles; slightly acid; gradual wavy boundary.

Bt3—32 to 48 inches; pale brown (10YR 6/3) very cobbly sandy clay loam, brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; very hard, very friable, slightly sticky and slightly plastic; common fine and very fine roots; many very fine tubular pores; few faint clay films on faces of peds; 20 percent cobbles, 35 percent pebbles; slightly acid; gradual wavy boundary.

BC—48 to 60 inches; pale brown (10YR 6/3) very cobbly sandy loam, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and

nonplastic; few fine and very fine roots; many very fine tubular pores; 20 percent cobbles, 30 percent pebbles; neutral.

Range in Characteristics

Rock fragments in the control section: 40 to 70 percent

A horizon

Hue: 7.5YR or 10YR

Value: 3 or 4 dry, 2 or 3 moist

Chroma: 1 or 2

Clay content: 15 to 27 percent

Rock fragments: 15 to 60 percent—0 to 50 percent stones and cobbles, 5 to 50 percent pebbles

Reaction: pH 6.1 to 7.3

Bt1 and Bt2 horizons

Hue: 5YR, 7.5YR, or 10YR

Value: 4, 5, or 6 dry; 3, 4, or 5 moist

Chroma: 2, 3, 4, or 6

Texture: loam, sandy loam, clay loam

Clay content: 15 to 35 percent

Rock fragments: 35 to 80 percent—5 to 50 percent stones and cobbles, 10 to 45 percent pebbles

Reaction: pH 6.1 to 7.3

Bt3 horizon

Hue: 5YR to 10YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 3, 4, or 6

Texture: clay loam, sandy clay loam

Clay content: 20 to 35 percent

Rock fragments: 35 to 85 percent—5 to 50 percent stones and cobbles, 10 to 40 percent pebbles

Reaction: pH 6.1 to 7.3

BC horizon

Hue: 5YR to 10YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 3, 4, or 6

Texture: sandy loam, sandy clay loam, loam

Clay content: 10 to 20 percent

Rock fragments: 40 to 85 percent—10 to 50 percent stones and cobbles, 30 to 45 percent pebbles

Reaction: pH 5.6 to 7.3

550F—Libeg-Arrowpeak-Elkner complex, 25 to 70 percent slopes

Setting

Landform:

* Libeg—Mountains

* Arrowpeak—Mountains

* Elkner—Mountains

Position on landform:

* Libeg—Backslopes and footslopes

* Arrowpeak—Shoulders and summits

* Elkner—Backslopes and footslopes

Slope:

* Libeg—25 to 70 percent

* Arrowpeak—25 to 70 percent

* Elkner—25 to 45 percent, northeast aspect

Mean annual precipitation: 20 to 28 inches

Frost-free period: 50 to 70 days

Composition

Major Components

Libeg and similar soils: 40 percent

Arrowpeak and similar soils: 25 percent

Elkner and similar soils: 20 percent

Minor Components

Garlet and similar soils: 0 to 4 percent

Moderately deep soils: 0 to 3 percent

Hedoes and similar soils: 0 to 2 percent

Stony surface layers: 0 to 2 percent

Areas of rock outcrop: 0 to 2 percent

Limber pine on south aspects: 0 to 2 percent

Major Component Description

Libeg

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Igneous colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.7 inches

Arrowpeak

Surface layer texture: Very cobbly loam

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Dominant parent material: Igneous residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 1.4 inches

Elkner

Surface layer texture: Sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Colluvium or residuum

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.8 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Lihen Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Somewhat excessively drained or well drained

Permeability: Rapid (6.0 to 20.0 inches/hour)

Landform: Stream terraces, sand dunes

Parent material: Alluvium, eolian deposits

Slope range: 0 to 10 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Sandy, mixed Entic Haploborolls

Typical Pedon

Lihen loamy fine sand, 0 to 6 percent slopes, in rangeland, 2,600 feet north and 300 feet west of the southeast corner of sec. 33, T. 27 N., R. 12 E.

A1—0 to 6 inches; grayish brown (10YR 5/2) loamy fine sand, dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; neutral; clear smooth boundary.

A2—6 to 12 inches; grayish brown (10YR 5/2) loamy fine sand, very dark grayish brown (10YR 3/2) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine tubular pores; neutral; clear wavy boundary.

Bk—12 to 17 inches; pale brown (10YR 6/3) loamy sand, brown (10YR 5/3) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine and fine irregular pores; few lime coatings on sand grains,

strongly effervescent; mildly alkaline; gradual wavy boundary.

B_{Ck}—17 to 40 inches; pale brown (10YR 6/3) loamy sand, brown (10YR 5/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; many very fine and fine irregular pores; few lime coatings on sand grains; strongly effervescent; mildly alkaline; gradual wavy boundary.

C—40 to 60 inches; light brownish gray (10YR 6/2) loamy sand, grayish brown (10YR 5/2) moist; single grain; loose, nonsticky and nonplastic; many very fine and fine irregular pores; strongly effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 12 to 18 inches

Content of clay in the control section: 0 to 10 percent

A horizons

Hue: 10YR or 2.5Y

Value: 3, 4, or 5 dry; 2 or 3 moist

Chroma: 2 or 3

Texture: fine sandy loam, loamy fine sand

Clay content: 5 to 20 percent

Rock fragments: 0 to 10 percent pebbles

Reaction: pH 6.6 to 7.8

An AB horizon is allowed

B_k, B_{Ck} horizons

Hue: 10YR or 2.5Y

Value: 5, 6, or 7 dry; 3, 4, 5, or 6 moist

Chroma: 2, 3, or 4

Texture: loamy fine sand, loamy sand, fine sand, sand

Clay content: 0 to 10 percent

Rock fragments: 0 to 15 percent pebbles

Calcium carbonate equivalent: 2 to 15 percent

Structure: single grain, platy, prismatic, blocky

Effervescence: strongly or violently

Reaction: pH 7.4 to 8.4

C horizon

Hue: 10YR or 2.5Y

Value: 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 2 or 3

Texture: loamy fine sand, loamy sand, fine sand, sand

Clay content: 0 to 10 percent

Rock fragments: 0 to 15 percent pebbles

Calcium carbonate equivalent: 0 to 12 percent

Effervescence: none to strongly

55B—Lihen loamy fine sand, 0 to 6 percent slopes

Setting

Landform: Stream terraces

Slope: 0 to 6 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Lihen and similar soils: 85 percent

Minor Components

Chinook and similar soils: 0 to 5 percent

Lonesome and similar soils: 0 to 5 percent

Gravelly surface layers: 0 to 5 percent

Major Component Description

Surface layer texture: Loamy fine sand

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.2 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Linnet Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Slow (0.06 to 0.2 inch/hour)

Landform: Lake plains, till plains

Parent material: Glaciofluvial deposits, glaciolacustrine deposits

Slope range: 0 to 2 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Fine, montmorillonitic Ustertic Argiborolls

Typical Pedon

Linnet silty clay, in an area of Scobey-Linnet complex, 0 to 4 percent slopes, in cropland, 1,700 feet north and 250 feet west of the southeast corner of sec. 22, T. 24 N., R. 3 E.

Ap—0 to 7 inches; grayish brown (10YR 5/2) silty clay, very dark grayish brown (10YR 3/2) moist; strong very fine and fine granular structure; slightly hard, friable, sticky and plastic; common very fine roots; neutral; abrupt smooth boundary.

Bt—7 to 14 inches; brown (10YR 5/3) silty clay, dark brown (10YR 3/3) moist; strong fine and medium prismatic structure parting to strong fine and medium angular blocky; very hard, friable, sticky and very plastic; common very fine roots; common very fine tubular pores; many distinct clay films on faces of peds; clear wavy boundary.

Bkss—14 to 26 inches; pale brown (10YR 6/3) silty clay, dark grayish brown (10YR 4/2) moist; moderate medium prismatic structure parting to moderate fine and medium angular blocky; very hard, friable, sticky and plastic; few very fine roots; common very fine tubular pores; few thin clay films on faces of peds; few intersecting slickensides; few medium masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk—26 to 36 inches; pale brown (10YR 6/3) silty clay, dark grayish brown (10YR 4/2) moist; weak coarse prismatic structure parting to moderate fine and medium subangular blocky; very hard, friable, sticky and plastic; few very fine roots; common very fine tubular pores; common medium masses of lime; violently effervescent; moderately alkaline; clear wavy boundary.

BCy—36 to 55 inches; light brownish gray (10YR 6/2) stratified silty clay loam and clay loam, dark grayish brown (10YR 4/2) moist; moderate thin laminar platy structure; very hard, friable, sticky and plastic; common very fine tubular pores; common fine and medium threads and masses of gypsum crystals; strongly effervescent; strongly alkaline; gradual wavy boundary.

C—55 to 60 inches; grayish brown (10YR 5/2) stratified silty clay loam and clay loam, brown (10YR 4/3) moist; weak moderately thick and thick laminar platy structure; hard, friable, sticky and plastic; common very fine tubular pores; slightly effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 15 inches
Content of clay in the control section: 45 to 60 percent
Depth to the Bkss horizon: 12 to 18 inches

Ap horizon

Hue: 10YR or 2.5Y
 Chroma: 2 or 3
 Clay content: 40 to 45 percent
 Rock fragments: 0 to 10 percent pebbles
 Reaction: pH 6.1 to 7.3

Bt horizon

Hue: 10YR or 2.5Y
 Value: 5 or 6 dry, 4 or 5 moist
 Chroma: 2, 3, or 4
 Clay content: 45 to 60 percent
 Texture: clay loam, silty clay loam, clay, silty clay
 Rock fragments: 0 to 10 percent pebbles
 Reaction: pH 6.6 to 7.8

Bk horizons

Hue: 10YR or 2.5Y
 Value: 5 or 6 dry, 4 or 5 moist
 Chroma: 2 or 3
 Texture: clay, silty clay, silty clay loam
 Clay content: 35 to 50 percent
 Rock fragments: 0 to 15 percent pebbles
 Calcium carbonate equivalent: 5 to 15 percent
 Sodium adsorption ratio: 0 to 13
 Reaction: pH 7.4 to 8.4

BCy and C horizons

Hue: 10YR, 2.5Y, or 5Y
 Value: 5 or 6 dry, 4 or 5 moist
 Chroma: 2 or 3
 Texture: clay, silty clay, clay loam, silty clay loam
 Clay content: 35 to 50 percent
 Rock fragments: 0 to 15 percent pebbles
 Gypsum content: 1 to 5 percent
 Sodium adsorption ratio: 2 to 13
 Reaction: pH 7.9 to 9.0

34A—Linnet silty clay, 0 to 2 percent slopes

Setting

Landform: Lake plains
Slope: 0 to 2 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Linnet and similar soils: 85 percent

Minor Components

Acel and similar soils: 0 to 10 percent
 Scobey and similar soils: 0 to 3 percent
 Nishon and similar soils: 0 to 2 percent

Major Component Description

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciolacustrine deposits
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.6 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

341B—Linnet-Marias silty clays, 0 to 4 percent slopes

Setting

Landform:

- * Linnet—Lake plains
- * Marias—Lake plains

Position on landform:

- * Linnet—Foothills and toeslopes
- * Marias—Backslopes and shoulders

Slope:

- * Linnet—0 to 2 percent
- * Marias—0 to 4 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Linnet and similar soils: 45 percent
 Marias and similar soils: 40 percent

Minor Components

Acel and similar soils: 0 to 10 percent

Kobase and similar soils: 0 to 5 percent

Major Component Description**Linnet**

Surface layer texture: Silty clay

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Glaciolacustrine deposits

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.6 inches

Marias

Surface layer texture: Silty clay

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Glaciolacustrine deposits

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.5 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Linwell Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Slow (0.06 to 0.2 inch/hour)

Landform: Hills

Parent material: Slope alluvium

Slope range: 15 to 45 percent

Annual precipitation: 17 to 19 inches

Annual air temperature: 41 to 44 degrees F

Frost-free period: 90 to 110 days

Taxonomic Class: Fine, montmorillonitic Typic Haploborolls

Typical Pedon

Linwell clay loam, in an area of Linwell-Winifred clay loams, 15 to 45 percent slopes, in rangeland, 1,800 feet south and 1,100 feet east of the northwest corner of sec. 30, T. 20 N., R. 8 E.

A1—0 to 6 inches; dark gray (10YR 4/1) clay loam, black (10YR 2/1) moist; strong medium and coarse granular structure; hard, friable, sticky and plastic; many very fine and fine and few medium roots; neutral; clear wavy boundary.

A2—6 to 11 inches; dark gray (10YR 4/1) clay loam, very dark gray (10YR 3/1) moist; weak medium prismatic structure parting to strong fine subangular blocky; hard, friable, sticky and plastic; many very fine and fine and few medium roots; common very fine tubular pores; neutral; clear wavy boundary.

Bw—11 to 24 inches; grayish brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) moist; weak medium prismatic structure parting to moderate fine and medium subangular blocky; very hard, firm, very sticky and very plastic; common very fine and few fine roots; common very fine tubular pores; moderately alkaline; clear wavy boundary.

Bk—24 to 31 inches; brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; very hard, firm, very sticky and very plastic; few very fine roots; common very fine tubular pores; few fine masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

BCK—31 to 60 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; massive; very hard, firm, very sticky and very plastic; common very fine tubular pores; common fine masses and threads of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 15 inches

Content of clay in the control section: 35 to 45 percent

Depth to the Bk horizon: 12 to 24 inches

A horizons

Hue: 10YR or 2.5Y

Value: 2 or 3 moist

Chroma: 1 or 2

Clay content: 30 to 40 percent

Rock fragments: 0 to 5 percent pebbles

Reaction: pH 6.6 to 7.8

Bw horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 or 3

Texture: silty clay loam, clay loam, silty clay

Clay content: 35 to 45 percent
 Rock fragments: 0 to 10 percent pebbles
 Reaction: pH 7.4 to 8.4

Bk horizon

Hue: 10YR or 2.5Y
 Value: 5 or 6 dry, 4 or 5 moist
 Chroma: 2 or 3
 Texture: silty clay loam, clay loam, silty clay
 Clay content: 35 to 45 percent
 Rock fragments: 0 to 10 percent pebbles
 Calcium carbonate equivalent: 5 to 15 percent
 Reaction: pH 7.4 to 8.4

BCh horizon

Hue: 7.5YR, 10YR through 5Y
 Value: 5, 6, or 7 dry; 4 or 5 moist
 Chroma: 2, 3, or 4
 Mottles: none to few
 Texture: silty clay loam, clay loam, silty clay
 Clay content: 35 to 45 percent
 Rock fragments: 0 to 15 percent pebbles
 Calcium carbonate equivalent: 5 to 12 percent
 Reaction: pH 7.9 to 8.4
 Accumulation of gypsum is allowed below a depth of 24 inches

623F—Linwell-Winifred clay loams, 15 to 45 percent slopes

Setting

Landform:

- * Linwell—Hills
- * Winifred—Hills

Position on landform:

- * Linwell—Backslopes and footslopes
- * Winifred—Backslopes and shoulders

Slope:

- * Linwell—15 to 45 percent
- * Winifred—15 to 45 percent

Mean annual precipitation: 17 to 19 inches

Frost-free period: 90 to 110 days

Composition

Major Components

Linwell and similar soils: 50 percent
 Winifred and similar soils: 35 percent

Minor Components

Wayden and similar soils: 0 to 5 percent
 Barkof and similar soils: 0 to 5 percent
 Amor and similar soils: 0 to 2 percent

Whitlash and similar soils: 0 to 1 percent
 Perma and similar soils: 0 to 1 percent
 Douglas-fir tree areas: 0 to 1 percent

Major Component Description

Linwell

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.3 inches

Winifred

Surface layer texture: Clay loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.1 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Lonesome Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Rapid (6.0 to 20.0 inches/hour) to 32 inches; below this depth slow (0.06 to 0.2 inch/hour)
Landform: Till plains, stream terraces, lake plains
Parent material: Eolian or eolian deposits over till or lacustrine material
Slope range: 0 to 6 percent
Annual precipitation: 11 to 14 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 105 to 125 days

Taxonomic Class: Sandy over loamy, mixed (calcareous), frigid Aridic Ustorthents

Typical Pedon

Lonesome loamy fine sand, 0 to 6 percent slopes, in cropland, 1,200 feet west and 350 feet north of the southeast corner of sec. 22, T. 28 N., R. 11 E.

Ap—0 to 6 inches; grayish brown (10YR 5/2) loamy fine sand, very dark grayish brown (10YR 3/2) moist; weak fine and moderate granular structure; soft, very friable, nonsticky and nonplastic; few very fine roots; neutral; abrupt smooth boundary.

A2—6 to 12 inches; grayish brown (10YR 5/2) loamy fine sand, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine tubular pores; neutral; clear wavy boundary.

Bw1—12 to 20 inches; brown (10YR 5/3) fine sand, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; many very fine tubular pores; neutral; gradual wavy boundary.

Bw2—20 to 32 inches; brown (10YR 5/3) fine sand, dark grayish brown (10YR 4/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic, many very fine tubular pores; neutral; abrupt wavy boundary.

2Bk1—32 to 43 inches; light brownish gray (2.5Y 6/2) silty clay loam, grayish brown (2.5Y 5/2) moist; weak fine and medium subangular blocky structure; hard, firm, sticky and plastic; common very fine tubular pores; common fine and medium masses of lime; violently effervescent; moderately alkaline; clear wavy boundary.

2Bk2—43 to 60 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; weak fine and medium subangular blocky structure; hard, firm, sticky and plastic; common very fine tubular pores; few fine and medium masses of lime; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to the 2Bk horizon: 20 to 35 inches

Ap and A2 horizons

Hue: 10YR or 2.5Y

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2, 3, or 4

Clay content: 5 to 15 percent

Rock fragments: 0 to 2 percent pebbles

Reaction: pH 6.6 to 7.8

Bw horizons

Hue: 10YR or 2.5Y

Value: 5 or 6 dry; 3, 4, or 5 moist

Chroma: 3 or 4

Texture: loamy fine sand, loamy sand, fine sand

Clay content: 5 to 15 percent

Rock fragments: 0 to 2 percent

Reaction: pH 6.6 to 7.8

2Bk horizons

Hue: 10YR or 2.5Y

Value: 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 2, 3, or 4

Texture: clay loam, loam, silty clay loam (contains less than 50 percent fine or coarser sand)

Clay content: 20 to 35 percent

Rock fragments: 0 to 5 percent

Calcium carbonate equivalent: 5 to 15 percent

Electrical conductivity: 0 to 4 mmhos/cm

Sodium adsorption ratio: 0 to 13

Reaction: pH 7.9 to 9.0

551B—Lonesome loamy fine sand, 0 to 6 percent slopes

Setting

Landform: Till plains and lake plains

Slope: 0 to 6 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Lonesome and similar soils: 85 percent

Minor Components

Chinook and similar soils: 0 to 5 percent

Yetull and similar soils: 0 to 5 percent

Fortbenton and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loamy fine sand

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Eolian over till or lacustrine material

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.5 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Lonna Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Alluvial fans, stream terraces, lake plains, small drainageways

Parent material: Glaciofluvial deposits, glaciolacustrine deposits

Slope range: 0 to 8 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Fine-silty, mixed, frigid Aridic Ustochrepts

Typical Pedon

Lonna silty clay loam, 0 to 4 percent slopes, in cropland, 500 feet south and 1,100 feet west of the northeast corner of sec. 5, T. 24 N., R. 5 E.

Ap—0 to 6 inches; grayish brown (10YR 5/2) silty clay loam, dark grayish brown (10YR 4/2) moist; strong fine and medium granular structure; slightly hard, very friable, sticky and plastic; few very fine roots; strongly effervescent; mildly alkaline; abrupt smooth boundary.

Bw—6 to 11 inches; grayish brown (10YR 5/2) silty clay loam, dark grayish brown (10YR 4/2) moist; moderate medium prismatic structure parting to strong fine and medium subangular blocky; hard, friable, sticky and plastic; few very fine roots; many very fine tubular pores; strongly effervescent; moderately alkaline; clear wavy boundary.

Bk—11 to 22 inches; grayish brown (10YR 5/2) silty clay loam, dark grayish brown (10YR 4/2) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; hard, friable, sticky and plastic; few very fine roots; many very fine tubular pores; common fine and few medium masses of lime; violently effervescent; moderately alkaline; clear wavy boundary.

By—22 to 34 inches; grayish brown and light brownish gray (2.5Y 5/2 and 2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure; very hard, friable, sticky and plastic; few very fine roots; common very fine tubular pores; common fine and medium masses of gypsum; slightly effervescent; moderately alkaline; clear wavy boundary.

BC—34 to 60 inches; grayish brown and light brownish gray (10YR 5/2 and 10YR 6/2) silty clay loam, brown (10YR 5/3) moist; thin and very thin laminar platy structure; very hard, friable, sticky and plastic; common very fine tubular pores; slightly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 18 to 35 percent

Ap horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry; 3, 4 or 5 moist

Chroma: 2, 3, or 4

Texture: loam, silty clay loam

Clay content: 18 to 35 percent

Effervescence: slightly or strongly

Reaction: pH 7.4 to 8.4

Uncultivated areas have A horizons 2 to 4 inches thick

Bw horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2, 3, or 4

Texture: silt loam, silty clay loam

Clay content: 18 to 35 percent

Effervescence: slightly or strongly

Reaction: pH 7.4 to 8.4

Bk and By horizon

Hue: 10YR or 2.5Y

Value: 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 2, 3, or 4

Texture: silt loam, silty clay loam

Clay content: 18 to 35 percent

Calcium carbonate equivalent: 5 to 15 percent

Electrical conductivity: 2 to 8 mmhos/cm

Sodium adsorption ratio: 1 to 13

Effervescence: strongly or violently

Reaction: pH 7.9 to 9.0

BC horizon

Hue: 10YR or 2.5Y

Value: 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 2, 3, or 4

Texture: very fine sandy loam, loam, silt loam, silty clay loam (may be stratified)

Clay content: 10 to 35 percent

Electrical conductivity: 2 to 16 mmhos/cm

Sodium adsorption ratio: 10 to 20

Effervescence: strongly or violently

Reaction: pH 7.9 to 9.0

58B—Lonna silty clay loam, 0 to 4 percent slopes**Setting***Landform:* Lake plains*Slope:* 0 to 4 percent*Mean annual precipitation:* 11 to 14 inches*Frost-free period:* 105 to 125 days**Composition****Major Components**

Lonna and similar soils: 85 percent

Minor Components

Ethridge and similar soils: 0 to 8 percent

Yamacall, calcareous soils: 0 to 5 percent

Fine sandy loam substratums: 0 to 2 percent

Major Component Description*Surface layer texture:* Silty clay loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Glaciolacustrine deposits*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 9.3 inches**Management**

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

58C—Lonna silty clay loam, 4 to 8 percent slopes**Setting***Landform:* Alluvial fans, stream terraces and drainageways*Slope:* 4 to 8 percent*Mean annual precipitation:* 11 to 14 inches*Frost-free period:* 105 to 125 days**Composition****Major Components**

Lonna and similar soils: 85 percent

Minor Components

Ethridge and similar soils: 0 to 5 percent

Yamacall, calcareous soils: 0 to 5 percent

Chinook and similar soils: 0 to 5 percent

Major Component Description*Surface layer texture:* Silty clay loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Glaciofluvial deposits*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 9.3 inches**Management**

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Lubrecht Series*Depth class:* Moderately deep (20 to 40 inches)*Drainage class:* Well drained*Permeability:* Slow (0.06 to 0.2 inch/hour)*Landform:* Mountains*Parent material:* Residuum from shale*Slope range:* 8 to 35 percent*Annual precipitation:* 18 to 22 inches*Annual air temperature:* 40 to 43 degrees F*Frost-free period:* 70 to 100 days**Taxonomic Class:** Fine, mixed Glossic Eutroboralfs**Typical Pedon**

Lubrecht loam, in an area of Crow-Lubrecht loams, 8 to 35 percent slopes, in forest, 2,100 feet south and 800 feet east of the northwest corner of sec. 9, T. 28 N., R. 15 E.

O—2 inches to 0; slightly decomposed forest litter.

A—0 to 4 inches; dark gray (10YR 4/1) loam, black (10YR 2/1) moist; strong fine and medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine, very fine and few medium roots; neutral; clear smooth boundary.

E—4 to 6 inches; light brownish gray (10YR 6/2) clay loam, dark grayish brown (10YR 4/2) moist; weak medium prismatic structure parting to strong fine subangular blocky; slightly hard, very friable,

sticky and plastic; many fine and very fine roots; many very fine tubular pores; neutral; clear wavy boundary.

Bt/E—6 to 12 inches; Bt part (60 percent) grayish brown (10YR 5/2) clay, dark grayish brown (10YR 4/2) moist; E part (40 percent) is light brownish gray (10YR 6/2) clay loam, dark grayish brown (10YR 4/2) moist; moderate medium prismatic structure parting to strong fine and medium subangular blocky; very hard, firm, sticky and plastic; common fine and very fine roots; many very fine tubular pores; neutral; clear wavy boundary.

Bt1—12 to 22 inches; grayish brown (10YR 5/2) clay, dark grayish brown (10YR 4/2) moist; strong medium and coarse prismatic structure parting to strong medium subangular blocky; extremely hard, very firm, very sticky and very plastic; common fine and very fine roots; common very fine tubular pores; many distinct clay films on faces of peds; neutral; gradual wavy boundary.

Bt2—22 to 33 inches; grayish brown (10YR 5/2) clay, dark grayish brown (10YR 4/2) moist; moderate medium prismatic structure parting to strong medium subangular blocky; extremely hard, very firm, very sticky and very plastic; few fine and very fine roots; common very fine tubular pores; many faint clay films on faces of peds; neutral; clear wavy boundary.

Cr—33 to 60 inches; grayish brown (10YR 5/2) shale, dark grayish brown (10YR 4/2) moist.

Range in Characteristics

Content of clay in the control section: 38 to 55 percent

Depth to bedrock: 20 to 40 inches

E horizon

Value: 5 or 6 dry, 4 or 5 moist

Clay content: 10 to 27 percent

Texture: loam, clay loam, silt loam

Rock fragments: 0 to 15 percent pebbles

Reaction: pH 5.1 to 7.3

Bt/E horizon

Value: B part 5 or 6, E part 6 or 7 dry; B part 4 or 5, E part 4, 5, or 6 moist

Chroma: B part 2, 3, or 4; E part 2, 3, or 4

Texture: silty clay loam, clay loam

Clay content, mixed: 27 to 40 percent

Reaction: pH 5.6 to 7.3

Bt1 and Bt2 horizons

Hue: 10YR or 7.5YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2, 3, or 4

Texture: silty clay, clay

Clay content: 40 to 60 percent

Reaction: pH 5.6 to 7.3

Macar Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Alluvial fans, stream terraces, hills

Parent material: Alluvium or slope alluvium from sandstone and shale

Slope range: 0 to 35 percent

Annual precipitation: 14 to 17 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 100 to 120 days

Taxonomic Class: Fine-loamy, mixed, frigid Typic Ustochrepts

Typical Pedon

Macar loam, 4 to 8 percent slopes, in cropland, 1,300 feet north and 1,300 feet east of the southwest corner of sec. 13, T. 22 N., R. 10 E.

Ap—0 to 6 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; moderate fine and medium granular structure; soft, very friable, slightly sticky and slightly plastic; common fine and few medium roots; mildly alkaline; abrupt smooth boundary.

Bw—6 to 15 inches; brown (10YR 5/3) clay loam, brown (10YR 4/3) moist; weak medium prismatic structure parting to moderate fine and medium subangular blocky; hard, very friable, slightly sticky and slightly plastic; few fine and very fine roots; many very fine and few fine tubular pores; few fine masses of lime; strongly effervescent; mildly alkaline; clear wavy boundary.

Bk1—15 to 30 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; moderate fine and medium subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; few fine and very fine roots; many very fine and few fine tubular pores; common fine seams and masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk2—30 to 45 inches; pale brown (10YR 6/3) clay loam, brown (10YR 5/3) moist; weak fine and medium subangular blocky structure; very hard, friable, sticky and plastic; few very fine roots; many very fine tubular pores; common fine masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bk3—45 to 60 inches; pale brown (10YR 6/3) clay loam with strata of loam, brown (10YR 5/3) moist; weak fine and medium subangular structure; hard, friable, slightly sticky and slightly plastic; many very fine tubular pores; common fine masses of lime; strongly effervescent; strongly alkaline.

Range in Characteristics

Content of clay in the control section: 18 to 35 percent

Depth to the Bk horizon: 11 to 18 inches

Ap horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5 or 6 dry; 3, 4, or 5 moist

Chroma: 2 or 3

Clay content: 18 to 27 percent

Rock fragments: 0 to 30 percent—0 to 5 percent cobbles, 0 to 25 percent pebbles

Effervescence: none to slightly

Reaction: pH 6.6 to 8.4

A thin dark colored A horizon that does not meet the requirements for a mollic epipedon after mixing to 7 inches is allowed

Bw horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5, 6, or 7 dry; 3, 4, or 5 moist

Chroma: 2, 3, 4, or 6

Texture: loam, clay loam, silty clay loam

Clay content: 18 to 35 percent

Rock fragments: 0 to 5 percent pebbles

Effervescence: none to slightly

Electrical conductivity: 0 to 2 mmhos/cm

Reaction: pH 6.6 to 8.4

Bk1 horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 2, 3, 4, or 6

Texture: clay loam, loam, silty clay loam

Clay content: 18 to 35 percent

Rock fragments: 0 to 5 percent pebbles

Effervescence: slightly or strongly

Calcium carbonate equivalent: 8 to 15 percent

Electrical conductivity: 0 to 2 mmhos/cm

Reaction: pH 7.4 to 8.4

Bk2 and Bk3 horizons

Hue: 10YR, 2.5Y, or 5Y

Value: 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 2, 3, 4, or 6

Texture: clay loam, loam, silt loam, sandy clay loam, or silty clay loam (some fine strata of sandy loam and fine sandy loam are in some pedons)

Clay content: 15 to 30 percent with 35 to 55 percent fine sand and coarser

Rock fragments: 0 to 10 percent pebbles

Effervescence: strongly or violently

Calcium carbonate equivalent: 5 to 12 percent

Electrical conductivity: 0 to 2 mmhos/cm

Reaction: pH 7.4 to 8.4

96B—Macar loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Slope: 0 to 4 percent

Mean annual precipitation: 14 to 17 inches

Frost-free period: 100 to 120 days

Composition

Major Components

Macar and similar soils: 85 percent

Minor Components

Macar calcareous soils: 0 to 8 percent

Sagedale and similar soils: 0 to 5 percent

Tally and similar soils: 0 to 2 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.2 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

96C—Macar loam, 4 to 8 percent slopes

Setting

Landform: Alluvial fans

Slope: 4 to 8 percent

Mean annual precipitation: 14 to 17 inches

Frost-free period: 100 to 120 days

Composition

Major Components

Macar and similar soils: 85 percent

Minor Components

Macar calcareous soils: 0 to 8 percent

Sagedale and similar soils: 0 to 5 percent

Tally and similar soils: 0 to 2 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.2 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Marcott Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Somewhat poorly drained

Permeability: Slow (0.06 to 0.2 inch/hour)

Landform: Alluvial fans, stream terraces

Parent material: Alluvium

Slope range: 0 to 4 percent

Annual precipitation: 14 to 17 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 100 to 125 days

Taxonomic Class: Fine, mixed Aquic Haploborolls

Typical Pedon

Marcott silty clay loam, 0 to 3 percent slopes, in hayland, 1,320 feet east and 1,400 feet south of the northwest corner of sec. 9, T. 21 N., R. 10 E.

Ap—0 to 4 inches; gray (10YR 5/1) silty clay loam, very dark gray (10YR 3/1) moist; strong fine subangular blocky structure; hard, firm, very sticky and very plastic; many fine and very fine roots; mildly alkaline; clear smooth boundary.

Bw—4 to 15 inches; gray (10YR 5/1) silty clay, very dark gray (10YR 3/1) moist; strong fine subangular blocky structure; hard, firm, very sticky and very plastic; common very fine roots; common very fine tubular pores; mildly alkaline; gradual wavy boundary.

Bk—15 to 20 inches; gray (10YR 5/1) silty clay, dark gray (10YR 4/1) moist; few fine faint yellow (10YR 7/6) mottles; moderate to medium prismatic structure parting to moderate medium subangular blocky; very hard, very firm, very sticky and very plastic; few very fine roots; common very fine tubular pores; common medium masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bkg—20 to 30 inches; gray and light gray (10YR 5/1 and 6/1) silty clay loam, dark gray (10YR 4/1) moist; many fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; very hard, very firm, very sticky and very plastic; few fine roots; common very fine tubular pores; many medium masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

BCKg—30 to 60 inches; gray and light gray (10YR 5/1 and 6/1) silty clay loam, dark gray (10YR 4/1) moist; many fine distinct yellowish brown (10YR 5/6) mottles; massive; very hard, very firm, very sticky and very plastic; many medium masses of lime; violently effervescent; strongly alkaline.

Range in Characteristics

Content of clay in the control section: 35 to 50 percent

Depth to seasonal water table: 24 to 48 inches

Depth to the Bk horizon: 12 to 24 inches

Soil phases: Saline

Ap horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 3, 4, or 5 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 35 to 40 percent

Rock fragments: 0 to 5 percent pebbles

Electrical conductivity: 2 to 4 mmhos/cm, saline phase 4 to 8 mmhos/cm

Sodium adsorption ratio: 0 to 20

Reaction: pH 6.6 to 8.4

Bw horizon

Hue: 10YR, 2.5Y, or 5Y
 Value: 4, 5, 6, or 7 dry; 3, 4, or 5 moist
 Chroma: 1, 2, or 3
 Texture: clay loam, silty clay loam, silty clay, clay
 Clay content: 35 to 50 percent
 Rock fragments: 0 to 5 percent pebbles
 Electrical conductivity: 2 to 8 mmhos/cm; saline
 phase 8 to 16 mmhos/cm
 Sodium adsorption ratio: 0 to 25
 Calcium carbonate equivalent: 0 to 2 percent
 Reaction: pH 7.4 to 8.4

Bk, Bkg, and BCkg horizons

Hue: 10YR, 2.5Y, or 5Y
 Value: 4, 5, 6, or 7 dry; 4, 5, or 6 moist
 Chroma: 1, 2, or 3
 Texture: clay loam, silty clay loam, silty clay, or clay
 Clay content: 35 to 50 percent
 Rock fragments: 0 to 15 percent—0 to 5 percent
 cobbles, 0 to 10 percent pebbles
 Electrical conductivity: 4 to 8 mmhos/cm, saline
 phase 8 to 16 mmhos/cm
 Sodium adsorption ratio: 0 to 30
 Calcium carbonate equivalent: 3 to 15 percent
 Reaction: pH 7.4 to 9.0

324B—Marcott silty clay loam, 0 to 3 percent slopes**Setting**

Landform: Alluvial fans and stream terraces
Slope: 0 to 3 percent
Mean annual precipitation: 14 to 17 inches
Frost-free period: 100 to 120 days

Composition**Major Components**

Marcott and similar soils: 85 percent

Minor Components

Strongly saline soils: 0 to 5 percent
 Soils with loamy profiles: 0 to 3 percent
 Klayent and similar soils: 0 to 3 percent
 Areas that rarely flood: 0 to 2 percent
 Stratified loam to sand soils: 0 to 2 percent

Major Component Description

Surface layer texture: Silty clay loam
Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Apparent
Available water capacity: Mainly 8.5 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

2B—Marcott-Bigsandy complex, 0 to 4 percent slopes**Setting***Landform:*

- * Marcott—Alluvial fans and stream terraces
- * Bigsandy—Flood plains

Slope:

- * Marcott—0 to 4 percent
- * Bigsandy—0 to 2 percent

Mean annual precipitation: 14 to 17 inches

Frost-free period: 100 to 125 days

Composition**Major Components**

Marcott and similar soils: 50 percent
 Bigsandy and similar soils: 35 percent

Minor Components

Savage and similar soils: 0 to 3 percent
 Gravelly substratums: 0 to 5 percent
 Poorly drained, sandy soils: 0 to 5 percent
 Shambo and similar soils: 0 to 2 percent

Major Component Description**Marcott**

Surface layer texture: Silty clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Apparent
Salt affected: Saline within 30 inches
Available water capacity: Mainly 6.8 inches

Bigsandy*Surface layer texture:* Loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Poorly drained*Dominant parent material:* Alluvium*Flooding:* Occasional*Water table:* Apparent*Salt affected:* Saline within 30 inches*Available water capacity:* Mainly 4.0 inches**Management**

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Marias Series*Depth class:* Very deep (greater than 60 inches)*Drainage class:* Well drained*Permeability:* Very slow (<0.06 inch/hour)*Landform:* Lake plains*Parent material:* Glaciolacustrine deposits*Slope range:* 0 to 8 percent*Annual precipitation:* 11 to 14 inches*Annual air temperature:* 42 to 45 degrees F*Frost-free period:* 105 to 125 days

Taxonomic Class: Fine, montmorillonitic, frigid
Chromic Udic Haplusterts

Typical Pedon

Marias silty clay, 0 to 4 percent slopes, in cropland, 1,280 feet west and 200 feet north of the southeast corner of sec. 5, T. 26 N., R. 5 E.

Ap—0 to 6 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; moderate very fine and fine granular structure; slightly hard, friable, sticky and plastic; many very fine and fine roots; slightly effervescent; mildly alkaline; abrupt smooth boundary.

Bw—6 to 12 inches; light brownish gray (2.5Y 6/2) silty clay, grayish brown (2.5Y 5/2) moist; moderate medium and coarse subangular blocky structure; hard, firm, very sticky and very plastic; common very fine and fine roots; common very fine tubular pores; slightly effervescent; moderately alkaline; gradual wavy boundary.

Bkss—12 to 38 inches; light brownish gray (2.5Y 6/2)

silty clay, grayish brown (2.5Y 5/2) moist; massive; very hard, firm, very sticky and very plastic; few very fine roots; few very fine tubular pores; few fine threads of lime; common intersecting slickensides; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bssy—38 to 60 inches; light yellowish brown (2.5Y 6/4) silty clay, light olive brown (2.5Y 5/4) moist; massive; very hard, firm, very sticky and very plastic; few very fine tubular pores; common slickensides; many medium masses of gypsum; strongly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 40 to 60 percent
Depth to the Bssy horizon: 20 to 45 inches

Ap horizon

Hue: 10YR, 2.5Y, 5Y

Value: 4, 5, or 6 dry; 3, 4, or 5 moist

Chroma: 1, 2, or 3

Clay content: 40 to 60 percent

Electrical conductivity: 0 to 4 mmhos/cm

Sodium adsorption ratio: 1 to 4

Reaction: pH 7.4 to 8.4

Bw horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 or 3

Texture: clay, silty clay

Clay content: 40 to 60 percent

Electrical conductivity: 0 to 4 mmhos/cm

Sodium adsorption ratio: 1 to 4

Reaction: pH 7.9 to 8.4

Bkss horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 or 3

Texture: clay, silty clay

Clay content: 40 to 60 percent

Slickensides: common or many

Electrical conductivity: 0 to 4 mmhos/cm

Sodium adsorption ratio: 1 to 4

Reaction: pH 7.9 to 8.4

Bssy horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5 or 6 dry; 3, 4, or 5 moist

Chroma: 1, 2, 3, or 4

Texture: clay or silty clay

Clay content: 40 to 60 percent

Gypsum content: 1 to 6 percent

Electrical conductivity: 2 to 4 mmhos/cm above a depth of 30 inches and 2 to 8 mmhos/cm below
Sodium adsorption ratio: 1 to 4 above 30 inches and 4 to 13 below
Reaction: pH 7.9 to 9.0

47B—Marias silty clay, 0 to 4 percent slopes

Setting

Landform: Lake plains
Slope: 0 to 4 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Marias and similar soils: 85 percent

Minor Components

Kobase and similar soils: 0 to 6 percent
Ethridge and similar soils: 0 to 5 percent
Moderately saline soils: 0 to 3 percent
Poorly drained soils: 0 to 1 percent

Major Component Description

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciolacustrine deposits
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.5 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

47C—Marias silty clay, 4 to 8 percent slopes

Setting

Landform: Lake plains
Slope: 4 to 8 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Marias and similar soils: 85 percent

Minor Components

Kobase and similar soils: 0 to 5 percent
Ethridge and similar soils: 0 to 5 percent
Clay loam till substratums: 0 to 3 percent
Moderately saline soils: 0 to 2 percent

Major Component Description

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciolacustrine deposits
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.5 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

471B—Marias-Kobase complex, 0 to 4 percent slopes

Setting

Landform:
* Marias—Lake plains
* Kobase—Lake plains
Position on landform:
* Marias—Foothills and toeslopes
* Kobase—Backslopes and shoulders
Slope:
* Marias—0 to 4 percent
* Kobase—0 to 4 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Marias and similar soils: 45 percent
Kobase and similar soils: 40 percent

Minor Components

Acel and similar soils: 0 to 5 percent

Clay loam till substratums: 0 to 5 percent
 Slopes more than 4 percent: 0 to 4 percent
 Poorly drained soils: 0 to 1 percent

Major Component Description

Marias

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciolacustrine deposits
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.5 inches

Kobase

Surface layer texture: Silty clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciolacustrine deposits
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.6 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Marmarth Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Sedimentary plains
Parent material: Residuum from interbedded sandstone and shale
Slope range: 2 to 8 percent
Annual precipitation: 11 to 14 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 105 to 125 days

Taxonomic Class: Fine-loamy, mixed Aridic Argiborolls

Typical Pedon

Marmarth loam, 2 to 8 percent slopes, in cropland, 2,200 feet north and 2,150 feet east of the southwest corner of sec. 11, T. 24 N., R. 10 E.

Ap—0 to 7 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; strong fine granular structure, slightly hard, very friable, sticky and plastic; few very fine roots; neutral; abrupt smooth boundary.

Bt—7 to 11 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; hard, very friable, sticky and plastic; few very fine roots; common very fine tubular pores; common faint clay films on faces of peds; neutral, clear wavy boundary.

Bk1—11 to 17 inches; light brownish gray (2.5Y 6/2) clay loam, grayish brown (2.5Y 5/2) moist; weak medium prismatic structure parting to moderate medium subangular blocky; hard, very friable, sticky and plastic; few very fine roots; common very fine tubular pores; common fine threads of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bk2—17 to 30 inches; light brownish gray (2.5Y 6/2) loam, grayish brown (2.5Y 5/2) moist; weak medium subangular blocky structure; very friable, sticky and slightly plastic; few very fine roots; common very fine tubular pores; common fine threads of lime; strongly effervescent; moderately alkaline; clear smooth boundary.

Cr—30 to 60 inches; light yellowish brown (2.5Y 6/4) interbedded sandstone and shale, light olive brown (2.5Y 5/4) moist; slightly effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 16 inches and may include all or part of the Bt horizon

Content of clay in the control section: 18 to 35 percent

Depth to bedrock: 20 to 40 inches

Depth to the Bk horizon: 8 to 16 inches

A horizon

Hue: 10YR

Value: 3, 4, or 5 moist

Chroma: 2 or 3

Clay content: 20 to 27 percent

Reaction: pH 6.6 to 7.3

Bt horizon

Hue: 10YR or 2.5Y

Value: 3, 4, 5, or 6 moist

Chroma: 2 to 4

Texture: loam, clay loam, sandy clay loam

Clay content: 18 to 35 percent
Reaction: pH 6.6 to 7.8

Bk horizons

Hue: 2.5Y or 5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2 to 4
Texture: loam, fine sandy loam, clay loam
Clay content: 15 to 30 percent
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.4 to 8.4

422C—Marmarth loam, 2 to 8 percent slopes

Setting

Landform: Sedimentary plains
Slope: 2 to 8 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Marmarth and similar soils: 85 percent

Minor Components

Evanston and similar soils: 0 to 5 percent
Delpoint and similar soils: 0 to 5 percent
Joplin and similar soils: 0 to 3 percent
Cabbart and similar soils: 0 to 2 percent

Major Component Description

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Interbedded sandstone and shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.1 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Martinsdale Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderately slow (0.2 to 0.6 inch/hour)
Landform: Relict stream terraces
Parent material: Alluvium
Slope range: 0 to 15 percent
Annual precipitation: 14 to 19 inches
Annual air temperature: 41 to 45 degrees F
Frost-free period: 90 to 120 days

Taxonomic Class: Fine-loamy, mixed Typic Argiborolls

Typical Pedon

Martinsdale loam, in an area of Martinsdale-Turner loams, 0 to 2 percent slopes, in rangeland, 1,200 feet north and 1,800 feet west of the southeast corner of sec. 1, T. 21 N., R. 9 E.

A—0 to 4 inches; very dark grayish brown (10YR 3/2) loam, very dark brown (10YR 2/2) moist; strong medium granular structure; soft, very friable, slightly sticky and slightly plastic; many fine and medium roots; 5 percent pebbles; neutral; clear smooth boundary.

Bt1—4 to 11 inches; brown (10YR 4/3) clay loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; hard, very friable, sticky and plastic; many fine roots and common medium roots; common fine and very fine tubular pores; many distinct clay films on faces of peds; few pebbles; neutral; clear wavy boundary.

Bt2—11 to 18 inches; brown (10YR 5/3) clay loam, brown (10YR 4/3) moist; weak medium prismatic structure parting to moderate fine subangular blocky; hard, very friable, sticky and plastic; common fine and very fine roots; common fine and very fine tubular pores; many faint clay films on faces of peds; few pebbles; neutral; clear wavy boundary.

Bk—18 to 25 inches; light gray (10YR 7/2) clay loam, brown (10YR 5/3) moist; moderate fine subangular blocky structure; hard, friable, sticky and slightly plastic; common fine and very fine roots; many fine and very fine tubular pores; few pebbles; disseminated lime; violently effervescent; moderately alkaline; clear wavy boundary.

BCK1—25 to 40 inches; white (10YR 8/2) clay loam, light gray (10YR 7/2) moist; massive; slightly hard, friable, sticky and slightly plastic; few fine and very fine roots; many fine and very fine tubular pores; few pebbles; disseminated lime; violently effervescent; moderately alkaline; gradual wavy boundary.

BCK2—40 to 60 inches; light brownish gray (10YR 6/2) gravelly loam, brown (10YR 5/3) moist; massive; slightly hard, friable, sticky and slightly plastic; many fine and very fine tubular pores; 20 percent pebbles; disseminated lime; violently effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 16 inches and includes all or part of the Bt1 horizon

Content of clay in the control section: 25 to 35 percent

Rock fragments in the control section: 0 to 15 percent

Depth to the Bk horizon: 11 to 30 inches

Soil phases: Stony

A horizon

Hue: 7.5YR or 10YR

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 2 or 3

Clay content: 18 to 27 percent

Rock fragments: 0 to 25 percent—0 to 10 percent cobbles, 0 to 15 percent pebbles

Reaction: pH 6.6 to 7.8

Bt1 horizon

Hue: 7.5YR or 10YR

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 2, 3, or 4

Texture: sandy clay loam, loam, clay loam

Clay content: 25 to 35 percent

Rock fragments: 0 to 15 percent—0 to 5 percent cobbles, 0 to 15 percent pebbles

Reaction: pH 6.6 to 8.4

Bt2 horizon

Hue: 7.5YR or 10YR

Value: 4, 5, or 6 dry; 3 or 4 moist

Chroma: 3 or 4

Texture: loam, clay loam, sandy clay loam

Clay content: 25 to 35 percent

Rock fragments: 0 to 15 percent—0 to 5 percent cobbles, 0 to 15 percent pebbles

Reaction: pH 6.6 to 8.4

Bk, BCK1, and BCK2 horizons

Hue: 10YR or 2.5Y

Value: 6, 7, or 8 dry; 4, 5, 6, or 7 moist

Chroma: 2, 3, or 4

Texture: loam, clay loam, sandy clay loam, sandy loam, gravelly loam

Clay content: 20 to 35 percent

Calcium carbonate equivalent: 5 to 35 percent

Rock fragments: 0 to 25 percent—0 to 5 percent cobbles, 0 to 20 percent pebbles

Reaction: pH 7.4 to 8.4

511C—Martinsdale loam, 2 to 8 percent slopes

Setting

Landform: Relict stream terraces

Position on landform: Treads

Slope: 2 to 8 percent

Mean annual precipitation: 14 to 17 inches

Frost-free period: 100 to 120 days

Composition

Major Components

Martinsdale and similar soils: 85 percent

Minor Components

Turner and similar soils: 0 to 10 percent

Tally and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.5 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

512C—Martinsdale stony loam, 4 to 15 percent slopes

Setting

Landform: Relict stream terraces

Position on landform: Treads

Slope: 4 to 15 percent

Mean annual precipitation: 17 to 19 inches

Frost-free period: 90 to 110 days

Composition

Major Components

Martinsdale and similar soils: 85 percent

Minor Components

Very stony surface layers: 0 to 4 percent

Slopes more than 15 percent: 0 to 5 percent

Turner and similar soils: 0 to 3 percent

Very cobbly soils: 0 to 2 percent

Bouldery surface layers: 0 to 1 percent

Major Component Description

Surface layer texture: Stony loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.7 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

511A—Martinsdale-Turner loams, 0 to 2 percent slopes

Setting

Landform:

* Martinsdale—Relict stream terraces

* Turner—Relict stream terraces

Position on landform:

* Martinsdale—Treads

* Turner—Treads

Slope:

* Martinsdale—0 to 2 percent

* Turner—0 to 2 percent

Mean annual precipitation: 14 to 17 inches

Frost-free period: 100 to 120 days

Composition

Major Components

Martinsdale and similar soils: 50 percent

Turner and similar soils: 35 percent

Minor Components

Beaverton and similar soils: 0 to 10 percent

Very cobbly surface layers: 0 to 5 percent

Major Component Description

Martinsdale

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.5 inches

Turner

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 6.1 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Marvan Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Very slow (<0.06 inch/hour)

Landform: Alluvial fans, stream terraces, sedimentary plains

Parent material: Alluvium

Slope range: 0 to 8 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Fine, montmorillonitic, frigid Sodic Haplusterts

Typical Pedon

Marvan clay, 0 to 4 percent slopes, in rangeland, 700 feet east and 2,500 feet south of the northwest corner of sec. 23, T. 23 N., R. 16 E.

A—0 to 3 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; moderate fine granular structure; hard, friable, very sticky and very plastic; common very fine and fine roots; moderately alkaline; clear smooth boundary.

Bss—3 to 18 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure; very hard, firm, very sticky and very plastic; common very fine and fine roots; common very fine tubular pores; few intersecting slickensides; slightly effervescent; strongly alkaline; clear wavy boundary.

Bssy—18 to 46 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; massive; extremely hard, firm, sticky and very plastic; few very fine and fine roots; common very fine tubular pores; few slickensides; common fine and medium masses of gypsum; slightly effervescent; moderately alkaline; gradual wavy boundary.

Bnyz—46 to 60 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; massive; extremely hard, firm, sticky and very plastic; few very fine roots; common very fine tubular pores; common fine and medium masses of gypsum and other salts; slightly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 45 to 60 percent

Depth to the Bssy horizon: 10 to 24 inches

Soil phases: Saline

A horizon

Hue: 2.5Y or 5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2, 3, or 4

Texture: clay, silty clay

Clay content: 40 to 60 percent

Electrical conductivity: 0 to 4 mmhos/cm; saline phase is 2 to 8 mmhos/cm

Sodium adsorption ratio: 8 to 18 above a depth of 24 inches and 13 to 38 below that depth (Where the SAR is 8 or less, the sodium plus magnesium is greater than calcium plus acidity)

Reaction: pH 7.4 to 9.0

Bss horizon

Hue: 2.5Y or 5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2, 3, or 4

Texture: clay, silty clay

Clay content: 45 to 60 percent

Electrical conductivity: 2 to 8 mmhos/cm

Sodium adsorption ratio: 4 to 38 (Where the SAR is below 8, the sodium plus magnesium is greater than calcium plus acidity)

Reaction: pH 7.9 to 9.0

Bssy horizon

Hue: 2.5Y or 5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2, 3, or 4

Texture: clay, silty clay

Clay content: 45 to 60 percent

Gypsum content: 1 to 5 percent

Electrical conductivity: 2 to 16 mmhos/cm

Sodium adsorption ratio: 8 to 18 above a depth of 24 inches and 13 to 38 below that depth (Where the SAR is below 8, the sodium plus magnesium is greater than calcium plus acidity)

Reaction: pH 7.9 to 9.0

Bnyz horizon

Hue: 2.5Y or 5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2, 3, or 4

Texture: clay or silty clay that includes thin layers of silty clay loam and silt loam material

Clay content: 45 to 60 percent

Gypsum content: 1 to 5 percent

Electrical conductivity: 8 to 16 mmhos/cm

Sodium adsorption ratio: 13 to 38

Reaction: pH 7.9 to 9.0

30B—Marvan clay, 0 to 4 percent slopes**Setting***Landform:* Alluvial fans and stream terraces*Slope:* 0 to 4 percent*Mean annual precipitation:* 11 to 14 inches*Frost-free period:* 105 to 125 days**Composition****Major Components**

Marvan and similar soils: 85 percent

Minor Components

Vanda and similar soils: 0 to 5 percent

Bascovy and similar soils: 0 to 4 percent

Kobase and similar soils: 0 to 3 percent

Clay loam till substratums: 0 to 3 percent

Major Component Description*Surface layer texture:* Clay*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Alluvium*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 7.0 inches**Management**

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

30C—Marvan clay, 4 to 8 percent slopes**Setting***Landform:* Alluvial fans*Slope:* 4 to 8 percent*Mean annual precipitation:* 11 to 14 inches*Frost-free period:* 105 to 125 days**Composition****Major Components**

Marvan and similar soils: 85 percent

Minor Components

Vanda and similar soils: 0 to 5 percent

Bascovy and similar soils: 0 to 5 percent

Kobase and similar soils: 0 to 3 percent

Areas that occasionally flood: 0 to 2 percent

Major Component Description*Surface layer texture:* Clay*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Alluvium*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 7.0 inches**Management**

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

305A—Marvan-Nobe clays, 0 to 2 percent slopes**Setting***Landform:*

* Marvan—Stream terraces

* Nobe—Stream terraces

Position on landform:

* Marvan—Microlows

* Nobe—Microhighs

Slope:

* Marvan—0 to 2 percent

* Nobe—0 to 2 percent

Mean annual precipitation: 11 to 14 inches*Frost-free period:* 105 to 125 days**Composition****Major Components**

Marvan and similar soils: 55 percent

Nobe and similar soils: 35 percent

Minor Components

Stratified, loamy soils: 0 to 5 percent

Somewhat poorly drained soils: 0 to 3 percent

Areas that occasionally flood: 0 to 2 percent

Major Component Description

Marvan

Surface layer texture: Clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 6.5 inches

Nobe

Surface layer texture: Clay
Depth class: Very deep (more than 60 inches)
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 4.5 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

301A—Marvan-Vanda clays, 0 to 2 percent slopes

Setting

Landform:

- * Marvan—Alluvial fans and stream terraces
- * Vanda—Alluvial fans and stream terraces

Slope:

- * Marvan—0 to 2 percent
- * Vanda—0 to 2 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Marvan and similar soils: 50 percent
 Vanda and similar soils: 35 percent

Minor Components

Slightly saline soils: 0 to 10 percent
 Benz and similar soils: 0 to 5 percent

Major Component Description

Marvan

Surface layer texture: Clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.0 inches

Vanda

Surface layer texture: Clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 6.0 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

301C—Marvan-Vanda clays, 2 to 8 percent slopes

Setting

Landform:

- * Marvan—Alluvial fans
- * Vanda—Alluvial fans

Slope:

- * Marvan—2 to 8 percent
- * Vanda—2 to 8 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Marvan and similar soils: 50 percent
 Vanda and similar soils: 35 percent

Minor Components

Slightly saline soils: 0 to 5 percent
 Benz and similar soils: 0 to 5 percent

Bascovy and similar soils: 0 to 3 percent
Clay loam till substratums: 0 to 2 percent

Major Component Description

Marvan

Surface layer texture: Clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.0 inches

Vanda

Surface layer texture: Clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 6.0 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

McIlwaine Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderately rapid (2.0 to 6.0 inches/hour) to 26 inches, below this depth rapid (6.0 to 20.0 inches/hour)
Landform: Flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Annual precipitation: 15 to 19 inches
Annual air temperature: 41 to 45 degrees F
Frost-free period: 90 to 115 days

Taxonomic Class: Coarse-loamy over sandy or sandy-skeletal, mixed Cumulic Haploborolls

Typical Pedon

McIlwaine fine sandy loam, in an area of McIlwaine-Nesda-Straw complex, 0 to 2 percent slopes, in

hayland, 100 feet north and 1,600 feet west of the southeast corner of sec. 8, T. 20 N., R. 8 E.

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) fine sandy loam, very dark brown (10YR 2/2) moist; strong fine and medium granular structure; soft, very friable, slightly sticky and nonplastic; many fine and very fine roots; 5 percent pebbles; neutral; abrupt smooth boundary.

A2—6 to 15 inches; very dark grayish brown (10YR 3/2) fine sandy loam, very dark brown (10YR 2/2) moist; strong medium granular structure; slightly hard, very friable, slightly sticky and nonplastic; many fine and very fine roots; 5 percent pebbles; neutral; clear wavy boundary.

A3—15 to 26 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common fine and very fine roots; many very fine tubular pores; 5 percent pebbles; neutral; clear wavy boundary.

2C1—26 to 45 inches; dark gray (10YR 4/1) very gravelly loamy sand, very dark gray (10YR 3/1) moist; single grain; loose, nonsticky and nonplastic; few fine and very fine roots; many very fine irregular pores; 40 percent pebbles, 10 percent cobbles; neutral; gradual wavy boundary.

2C2—43 to 60 inches; dark gray (10YR 4/1) extremely gravelly sand, very dark gray (10YR 3/1) moist; single grain; loose, nonsticky and nonplastic; many fine and very fine irregular pores; 50 percent pebbles, 20 percent cobbles; neutral.

Range in Characteristics

Depth to the 2C horizon: 20 to 40 inches

Soil phases: Occasionally flooded

Ap horizon

Value: 3, 4, or 5 dry; 2 or 3 moist
Clay content: 5 to 18 percent
Rock fragments: 0 to 15 percent pebbles
Reaction: pH 6.6 to 7.3

A2 horizon

Value: 3, 4, or 5 dry; 2 or 3 moist
Texture: fine sandy loam, sandy loam, loam
Clay content: 5 to 18 percent
Rock fragments: 0 to 15 percent pebbles
Reaction: pH 6.6 to 7.3

A3 horizon

Value: 4 or 5 dry, 3 moist
Texture: fine sandy loam, sandy loam, loam

Clay content: 5 to 18 percent
 Rock fragments: 0 to 15 percent pebbles
 Reaction: pH 6.6 to 7.3

2C1 and 2C2 horizons

Hue: 2.5Y or 10YR
 Value: 4 or 5 dry, 3 or 4 moist
 Chroma: 1 or 2
 Texture: loamy sand, sand, loamy coarse sand, coarse sand
 Clay content: 0 to 5 percent
 Rock fragments: 35 to 80 percent—25 to 50 percent pebbles, 10 to 30 percent cobbles
 Reaction: pH 6.6 to 7.8

180A—Mcllwaine-Nesda-Straw complex, 0 to 2 percent slopes

Setting

Landform:

- * Mcllwaine—Flood plains
- * Nesda—Flood plains
- * Straw—Flood plains

Slope:

- * Mcllwaine—0 to 2 percent
- * Nesda—0 to 2 percent
- * Straw—0 to 2 percent

Mean annual precipitation: 17 to 19 inches

Frost-free period: 90 to 110 days

Composition

Major Components

Mcllwaine and similar soils: 45 percent
 Nesda and similar soils: 25 percent
 Straw and similar soils: 20 percent

Minor Components

Very cobbly surface layers: 0 to 5 percent
 Areas that occasionally flood: 0 to 3 percent
 Poorly drained soils: 0 to 2 percent

Major Component Description

Mcllwaine

Surface layer texture: Fine sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Available water capacity: Mainly 3.7 inches

Nesda

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Available water capacity: Mainly 3.4 inches

Straw

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Available water capacity: Mainly 9.1 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Megonot Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Sedimentary plains, hills
Parent material: Residuum from interbedded shale and sandstone
Slope range: 0 to 60 percent
Annual precipitation: 11 to 14 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 105 to 125 days

Taxonomic Class: Fine, montmorillonitic, frigid Aridic Ustochrepts

Typical Pedon

Megonot clay loam, in an area Megonot-Kobase-Delpoint complex, 2 to 8 percent slopes, in cropland, 1,000 feet west and 1,900 feet south of the northeast corner of sec. 10, T. 25 N., R. 16 E.

Ap—0 to 6 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium granular structure; hard, friable, sticky and plastic; many fine and very fine roots; mildly alkaline; abrupt smooth boundary.

Bw—6 to 11 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; few fine and very fine roots; common very fine tubular pores; slightly effervescent; moderately alkaline; gradual wavy boundary.

Bk—11 to 26 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium prismatic structure parting to moderate fine and medium subangular blocky; very hard, firm, very sticky and very plastic; few very fine roots; common very fine tubular pores; common fine and medium masses of lime; strongly effervescent; moderately alkaline; clear wavy boundary.

Cr—26 to 60 inches; light brownish gray (2.5Y 6/2) shale, dark grayish brown (2.5Y 4/2) moist; strongly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 35 to 45 percent

Depth to the Bk horizon: 10 to 15 inches

Depth to the Cr horizon: 20 to 40 inches

Ap horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 or 3

Texture: silty clay loam, clay loam

Clay content: 35 to 45 percent

Rock fragments: 0 to 15 percent pebbles

Reaction: pH 6.6 to 7.8

Bw horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 or 3

Texture: silty clay loam, clay loam, silty clay

Clay content: 35 to 45 percent

Rock fragments: 0 to 15 percent hard pebbles, 0 to 15 percent soft pebbles

Reaction: pH 7.4 to 8.4

Bk horizon

Hue: 2.5Y or 5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 or 3

Texture: silty clay loam, clay loam, silty clay

Clay content: 35 to 45 percent

Rock fragments: 0 to 15 percent hard pebbles, 0 to 15 percent soft pebbles

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.4 to 8.4

142C—Megonot-Kobase-Delpoint complex, 2 to 8 percent slopes

Setting

Landform:

* Megonot—Sedimentary plains

* Kobase—Sedimentary plains

* Delpoint—Sedimentary plains

Position on landform:

* Megonot—Backslopes and shoulders

* Kobase—Footslopes

* Delpoint—Backslopes and shoulders

Slope:

* Megonot—2 to 8 percent

* Kobase—2 to 8 percent

* Delpoint—2 to 8 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Megonot and similar soils: 40 percent

Kobase and similar soils: 30 percent

Delpoint and similar soils: 20 percent

Minor Components

Ethridge and similar soils: 0 to 3 percent

Yawdim and similar soils: 0 to 2 percent

Cabbart and similar soils: 0 to 2 percent

Slopes more than 8 percent: 0 to 2 percent

Weingart and similar soils: 0 to 1 percent

Major Component Description

Megonot

Surface layer texture: Clay loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Interbedded sandstone and shale residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 3.5 inches

Kobase

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.6 inches

Delpoint

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Interbedded sandstone and shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.9 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

141B—Megonot-Weingart-Delpoint complex, 0 to 4 percent slopes

Setting*Landform:*

- * Megonot—Sedimentary plains
- * Weingart—Sedimentary plains
- * Delpoint—Sedimentary plains

Position on landform:

- * Megonot—Backslopes and footslopes
- * Weingart—Microlows
- * Delpoint—Backslopes and shoulders

Slope:

- * Megonot—0 to 4 percent
- * Weingart—0 to 2 percent
- * Delpoint—0 to 4 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition**Major Components**

Megonot and similar soils: 40 percent
 Weingart and similar soils: 25 percent
 Delpoint and similar soils: 25 percent

Minor Components

Kobase and similar soils: 0 to 3 percent
 Strongly saline/sodic soils: 0 to 3 percent
 Ethridge and similar soils: 0 to 2 percent
 Yamacall and similar soils: 0 to 2 percent

Major Component Description**Megonot**

Surface layer texture: Clay loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Interbedded sandstone and shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.5 inches

Weingart

Surface layer texture: Clay loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Interbedded sandstone and shale residuum
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 3.4 inches

Delpoint

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Interbedded sandstone and shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.9 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

182F—Megonot-Yawdim silty clay loams, 25 to 60 percent slopes

Setting*Landform:*

- * Megonot—Hills
- * Yawdim—Hills

Position on landform:

- * Megonot—Backslopes and footslopes
- * Yawdim—Backslopes and shoulders

Slope:

- * Megonot—25 to 60 percent
- * Yawdim—25 to 60 percent

Mean annual precipitation: 11 to 14 inches*Frost-free period:* 105 to 125 days**Composition****Major Components**

Megonot and similar soils: 45 percent
 Yawdim and similar soils: 40 percent

Minor Components

Very deep, clayey soils: 0 to 8 percent
 Delpoint and similar soils: 0 to 3 percent
 Yamacall and similar soils: 0 to 2 percent
 Areas of rock outcrop: 0 to 2 percent

Major Component Description**Megonot**

Surface layer texture: Silty clay loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.5 inches

Yawdim

Surface layer texture: Silty clay loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.7 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

M-W—Miscellaneous Water**Composition****Major Components**

Miscellaneous water: 100 percent

Major Component Description

Definition: Areas of open water in sewage lagoons, industrial waste pits, fish hatcheries, etc.

Neldore Series

Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Sedimentary plains, hills, escarpments
Parent material: Residuum from shale
Slope range: 2 to 70 percent
Annual precipitation: 11 to 14 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 105 to 125 days

Taxonomic Class: Clayey, montmorillonitic, nonacid, frigid, shallow Aridic Ustorthents

Typical Pedon

Neldore silty clay, in an area of Neldore-Rock outcrop complex, 25 to 70 percent slopes, in rangeland, 1,200 feet west and 500 feet north of the southeast corner of sec. 6, T. 24 N., R. 8 E.

A—0 to 4 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; moderate fine and medium granular structure; hard, friable, sticky and plastic; common fine roots; common fine masses of gypsum; mildly alkaline; clear wavy boundary.

C—4 to 15 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; moderate thin platy structure; very hard, friable, very sticky and very plastic; common fine roots; common very fine tubular pores; 20 percent soft thin shale chips; common fine masses of gypsum; mildly alkaline; clear wavy boundary.

Cr—15 to 60 inches; grayish brown (2.5Y 5/2) and light brownish gray (2.5Y 6/2) shale, dark grayish brown

(2.5Y 4/2) moist; few medium masses of gypsum crystals between plates; neutral.

Range in Characteristics

Content of clay in the control section: 40 to 60 percent
Depth to the Cr horizon: 10 to 20 inches

A horizon

Hue: 10YR, 2.5Y, or 5Y
 Value: 4, 5, or 6 dry; 3, 4, or 5 moist
 Chroma: 1 or 2
 Clay content: 40 to 50 percent
 Rock fragments: 0 to 10 percent—0 to 5 percent stones and cobbles, 0 to 5 percent pebbles
 Electrical conductivity: 0 to 2 mmhos/cm
 Reaction: pH 5.6 to 7.8

C horizon

Hue: 10YR, 2.5Y, or 5Y
 Value: 5 or 6 dry, 4 or 5 moist
 Chroma: 1 or 2
 Texture: clay or silt clay
 Clay content: 40 to 60 percent
 Rock fragments: 5 to 35 percent—5 to 25 percent soft shale fragments, 0 to 10 percent hard shale fragments
 Electrical conductivity: 0 to 4 mmhos/cm
 Reaction: pH 5.6 to 7.8

971F—Neldore-Bascovy silty clays, 25 to 60 percent slopes

Setting

Landform:

- * Neldore—Hills
- * Bascovy—Hills

Position on landform:

- * Neldore—Backslopes and shoulders
- * Bascovy—Backslopes and footslopes

Slope:

- * Neldore—25 to 60 percent
- * Bascovy—25 to 45 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Neldore and similar soils: 45 percent
 Bascovy and similar soils: 40 percent

Minor Components

Very deep, loamy soils: 0 to 5 percent
 Areas of rock outcrop: 0 to 5 percent
 Calcareous soils: 0 to 3 percent
 Saline and sodic soils: 0 to 1 percent
 Ponderosa pine (eastern part): 0 to 1 percent

Major Component Description

Neldore

Surface layer texture: Silty clay
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.2 inches

Bascovy

Surface layer texture: Silty clay
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Shale residuum
Native plant cover type: Rangeland
Flooding: None
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 4.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

974F—Neldore-Hillon complex, 25 to 70 percent slopes

Setting

Landform:

- * Neldore—Escarpments
- * Hillon—Escarpments

Position on landform:

- * Neldore—Backslopes and footslopes
- * Hillon—Backslopes and shoulders

Slope:

- * Neldore—25 to 70 percent
- * Hillon—25 to 70 percent

Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Neldore and similar soils: 55 percent
 Hillon and similar soils: 30 percent

Minor Components

Lambeth and similar soils: 0 to 5 percent
 Sunburst and similar soils: 0 to 3 percent
 Bascovy and similar soils: 0 to 3 percent
 Areas of rock outcrop: 0 to 3 percent
 Tinsley and similar soils: 0 to 1 percent

Major Component Description

Neldore

Surface layer texture: Silty clay
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.2 inches

Hillon

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 10.0 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

972F—Neldore-Rock outcrop complex, 25 to 70 percent slopes

Setting

Landform:

- * Neldore—Hills
- * Rock outcrop—Escarpments

Slope: 25 to 70 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Neldore and similar soils: 60 percent
 Rock outcrop: 25 percent

Minor Components

Bascovy and similar soils: 0 to 5 percent
 Yetull and similar soils: 0 to 3 percent
 Slopes less than 25 percent: 0 to 3 percent
 Strongly saline, shallow soils: 0 to 2 percent
 Yamac and similar soils: 0 to 2 percent

Major Component Description

Neldore

Surface layer texture: Silty clay
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.2 inches

Rock outcrop

Definition: Exposures of shale bedrock

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Nesda Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: In the upper 12 inches moderate (0.6 to 2.0 inches/hour) or moderately rapid (2.0 to 6.0 inches/hour), below this depth rapid (6.0 to 20.0 inches/hour)
Landform: Flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Annual precipitation: 15 to 19 inches

Annual air temperature: 41 to 45 degrees F

Frost-free period: 90 to 115 days

Taxonomic Class: Sandy-skeletal, mixed Fluventic Haploborolls

Typical Pedon

Nesda loam, in an area of Nesda-McIlwaine complex, 0 to 2 percent slopes, in pasture, 300 feet east and 600 feet north of the southwest corner of sec. 11, T. 21 N., R. 7 E.

A1—0 to 5 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; mildly alkaline; clear smooth boundary.

A2—5 to 12 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium prismatic structure parting to moderate fine subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; common very fine and fine tubular pores; mildly alkaline; clear smooth boundary.

2C1—12 to 23 inches; dark gray (10YR 4/1) very gravelly sand, very dark gray (10YR 3/1) moist; single grain; loose, nonsticky and nonplastic; many fine irregular pores; 40 percent pebbles, 5 percent cobbles; mildly alkaline; gradual wavy boundary.

2C2—23 to 60 inches; dark grayish brown (10YR 4/2) very gravelly loamy sand, very dark grayish brown (10YR 3/2) moist; single grain, loose, nonsticky and nonplastic; many fine irregular pores; 45 percent pebbles, 10 percent cobbles; mildly alkaline.

Range in Characteristics

Mollic epipedon thickness: 10 to 16 inches

Content of clay in the control section: 0 to 10 percent

Rock fragments in the control section: 35 to 80 percent

Depth to the 2C horizon: 10 to 20 inches

Soil phases: Rarely flooded, occasionally flooded

A1 and A2 horizons

Hue: 10YR, 2.5Y, or 5Y

Value: 3, 4, or 5 dry; 2 or 3 moist

Chroma: 1, 2, or 3

Texture: loam, sandy loam

Clay content: 10 to 20 percent

Rock fragments: 0 to 65 percent—0 to 15 percent stones and cobbles, 0 to 50 percent pebbles

Reaction: pH 6.6 to 7.8

2C1 and 2C2 horizons

Hue: 10YR, 2.5Y, or 5Y

Value: 4, 5, 6, or 7 dry; 3, 4, or 5 moist

Chroma: 1, 2, 3, or 4

Texture: sand, loamy sand

Clay content: 0 to 10 percent

Rock fragments: 35 to 80 percent—0 to 15 percent stones and cobbles, 35 to 65 percent pebbles

Reaction: pH 7.4 to 8.4

130A—Nesda-McIlwaine complex, 0 to 2 percent slopes

Setting

Landform:

* Nesda—Flood plains

* Nesda—Flood plains

* McIlwaine—Flood plains

Slope:

* Nesda—0 to 2 percent

* Nesda—0 to 2 percent

* McIlwaine—0 to 2 percent

Mean annual precipitation: 15 to 19 inches

Frost-free period: 90 to 115 days

Composition

Major Components

Nesda and similar soils: 35 percent

Nesda and similar soils: 20 percent

McIlwaine and similar soils: 30 percent

Minor Components

Poorly drained soils: 0 to 5 percent

Rarely flooded rangeland soils: 0 to 3 percent

Enbar and similar soils: 0 to 3 percent

Areas that frequently flood: 0 to 2 percent

Farnuf soils on alluvial fans: 0 to 1 percent

Savage soils on alluvial fans: 0 to 1 percent

Major Component Description

Nesda

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Forest land
Flooding: Occasional
Available water capacity: Mainly 3.6 inches

Nesda

Surface layer texture: Very gravelly sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Forest land
Flooding: Occasional
Available water capacity: Mainly 2.8 inches

Mcllwaine

Surface layer texture: Fine sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Forest land
Flooding: Occasional
Available water capacity: Mainly 4.3 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Nishon Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Poorly drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Closed depressions
Parent material: Alluvium
Slope range: 0 to 1 percent
Annual precipitation: 11 to 17 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 100 to 125 days

Taxonomic Class: Fine, montmorillonitic, frigid Typic Albaqualfs

Typical Pedon

Nishon clay loam, 0 to 1 percent slopes, in cropland, 2,300 feet north and 1,200 feet east of the southwest corner of sec. 33, T. 26 N., R. 14 E.

Ap—0 to 6 inches; gray (10YR 5/1) clay loam, dark gray (10YR 4/1) moist; few distinct brown (10YR 5/3) dry mottles; moderate thin platy structure; very hard, friable, sticky and plastic; few very fine and fine roots; common fine and very fine vesicular and tubular pores; neutral; abrupt smooth boundary.

E—6 to 8 inches; light gray (10YR 6/1) clay loam, dark gray (10YR 4/1) moist; few distinct brown (10YR 5/3) dry mottles; moderate medium prismatic structure parting to strong fine subangular blocky; extremely hard, firm, very sticky and very plastic; few fine and very fine roots; few very fine tubular pores; common unstained sand grains on faces of peds; neutral; clear wavy boundary.

Bt—8 to 31 inches; gray (5Y 5/1) clay, dark gray (5Y 4/1) moist; few faint grayish brown (2.5Y 5/2) dry mottles; moderate medium prismatic structure parting to strong fine subangular blocky; extremely hard, very firm, very sticky and very plastic; few fine and very fine roots; few very fine tubular pores; common faint clay films on faces of peds; neutral; clear wavy boundary.

Bk1—31 to 44 inches; light gray (5Y 6/1) silty clay, dark gray (5Y 4/1) moist; weak coarse prismatic structure parting to moderate fine and medium subangular blocky; extremely hard, very firm, very sticky and very plastic; few very fine tubular pores; few fine threads and masses of lime; slightly effervescent; moderately alkaline; gradual wavy boundary.

Bk2—44 to 60 inches; light olive gray (5Y 6/2) clay loam, olive gray (5Y 4/2) moist; few faint light yellowish brown (2.5Y 6/4) dry mottles; weak coarse prismatic structure; extremely hard, firm, sticky and plastic; few very fine tubular pores; common fine threads and medium masses of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 40 to 60 percent

Depth to seasonal water table: Ponded to 36 inches

Depth to the Bk horizon: 16 to 34 inches

Ap and E horizons

Hue: 2.5Y or 10YR

Value: 5, 6, or 7 dry; 4 or 5 moist

Chroma: 1 or 2

Mottles: few to common (Hue: 10YR 5/3, 4/3)

Clay content: 27 to 35 percent

Reaction: pH 6.1 to 8.4

Bt horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 4, 5, or 6 dry; 3 or 4 moist

Chroma: 0, 1, or 2

Mottles: few to common (Hue: 10YR 5/3, 4/3, or 2.5Y 5/2, 5/3)

Texture: clay, silty clay

Clay content: 40 to 60 percent

Reaction: pH 6.6 to 8.4

Bk horizons

Hue: 2.5Y or 5Y

Value: 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 0, 1, 2, or 3

Mottles: few to common (Hue: 10YR 4/4, 6/4 moist)

Texture: clay loam, clay, or silty clay

Clay content: 35 to 55 percent

Calcium carbonate equivalent: 5 to 15 percent

Reaction: 7.4 to 9.0

28—Nishon clay loam, 0 to 1 percent slopes

Setting

Landform: Closed depressions

Slope: 0 to 1 percent

Mean annual precipitation: 11 to 17 inches

Frost-free period: 100 to 125 days

Composition

Major Components

Nishon and similar soils: 90 percent

Minor Components

Soils with clay surface layers: 0 to 3 percent

Moderately well drained soils: 0 to 3 percent

Moderately sodic soils: 0 to 2 percent

Strongly saline soils: 0 to 1 percent

Artificially drained areas: 0 to 1 percent

Major Component Description

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: Rare

Ponding: Long

Available water capacity: Mainly 9.3 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Nobe Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Moderately well drained or well drained

Permeability: Very slow (<0.06 inch/hour)

Landform: Alluvial fans, stream terraces, flood plains, small drainageways

Parent material: Alluvium, glaciofluvial deposits

Slope range: 0 to 4 percent

Annual precipitation: 11 to 17 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Fine, montmorillonitic (calcareous), frigid Oxyaquic Ustorthents

Typical Pedon

Nobe silty clay, in an area of Absher-Nobe complex, 0 to 4 percent slopes, in rangeland, 300 feet south and 500 feet west of the northeast corner of sec. 20, T. 27. N., R. 5 E.

E—0 to 1 inch; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; vesicular crust; very hard, firm, sticky and plastic; few very fine and fine roots; strongly effervescent; moderately alkaline; abrupt smooth boundary.

By—1 to 9 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; moderate fine and medium subangular blocky structure; very hard, firm, very sticky and very

plastic; few very fine roots; common very fine tubular pores; strongly effervescent; common fine and medium masses of gypsum; strongly alkaline; clear wavy boundary.

Byz1—9 to 20 inches; light brownish gray (2.5Y 6/2) silty clay, dark grayish brown (2.5Y 4/2) moist; moderate very fine and fine granular (flocculated) structure; hard, friable, very sticky and very plastic; few fine seams of gypsum and other salts; strongly effervescent; strongly alkaline; gradual wavy boundary.

Byz2—20 to 60 inches; light brownish gray (2.5Y 6/2) silty clay, dark grayish brown (2.5Y 4/2) moist; massive; very hard, firm, very sticky and very plastic; common very fine tubular pores; common fine and medium masses of gypsum and other salts; strongly effervescent; strongly alkaline.

Range in Characteristics

Content of clay in the control section: 35 to 60 percent

Depth to seasonal water table: 48 to 72 inches for rarely flooded and occasionally flooded phases

Depth to maximum zone of the salt accumulation: 8 to 16 inches

Soil phases: Rarely flooded, occasionally flooded

E horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5, 6, or 7 dry; 3, 4, or 5 moist

Chroma: 2 or 3

Texture: loam, clay loam, silty clay loam, silty clay, clay

Clay content: 20 to 50 percent

Electrical conductivity: 4 to 8 mmhos/cm

Sodium adsorption ratio: 0 to 13

Reaction: pH 6.6 to 8.4

By and Byz1 horizons

Hue: 10YR, 2.5Y, or 5Y

Value: 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 2 or 3

Texture: clay, silty clay, silty clay loam

Clay content: 35 to 60 percent

Electrical conductivity: 16 to 30 mmhos/cm

Gypsum content: 1 to 6 percent

Sodium adsorption ratio: 13 to 40 percent

Reaction: pH 7.9 to 9.6

Byz2 horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 2 or 3

Texture: clay, silty clay, or silty clay loam that is

stratified with loam, clay loam, and silt loam

Clay content: 35 to 60 percent

Electrical conductivity: 16 to 30 mmhos/cm

Gypsum content: 1 to 6

Sodium adsorption ratio: 13 to 70

Reaction: pH 7.9 to 9.6

Norbert Series

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Permeability: Very slow (<0.06 inch/hour)

Landform: Hills

Parent material: Residuum from shale

Slope range: 25 to 60 percent

Annual precipitation: 14 to 17 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 100 to 120 days

Taxonomic Class: Clayey, montmorillonitic

(calcareous), frigid, shallow Typic Ustorthents

Typical Pedon

Norbert silty clay, in an area of Norbert-Barkof silty clays, 25 to 60 percent slopes, in rangeland, 2,000 feet south and 2,600 feet east of the northwest corner of sec. 13, T. 21 N., R. 8 E.

A—0 to 5 inches; light brownish gray (2.5Y 6/2) silty clay, dark grayish brown (2.5Y 4/2) moist; moderate fine and medium granular structure; very hard, friable, very sticky and very plastic; common very fine and fine roots; strongly effervescent; moderately alkaline; abrupt smooth boundary.

Bk—5 to 12 inches; light brownish gray (2.5Y 6/2) silty clay, dark grayish brown (2.5Y 4/2) moist; weak fine and medium subangular blocky structure; very hard, firm, very sticky and very plastic; common very fine and fine roots, common very fine tubular pores; few fine seams of lime; strongly effervescent; moderately alkaline; clear wavy boundary.

Bky—12 to 18 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; weak fine and medium subangular blocky structure; few very fine roots; common very fine tubular pores; 30 percent soft shale chips; common fine threads and masses of lime; few fine masses of gypsum; strongly effervescent; moderately alkaline; clear wavy boundary.

Cr—18 to 60 inches; grayish brown (2.5Y 5/2) shale, dark grayish brown (2.5Y 4/2) moist; many seams of gypsum; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 50 to 60 percent

Depth to the Cr horizon: 10 to 20 inches

A horizon

Hue: 2.5Y or 5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 1 or 2

Clay content: 45 to 60 percent

Electrical conductivity: 0 to 4 mmhos/cm

Reaction: pH 7.4 to 8.4

Bk horizon

Hue: 2.5Y or 5Y

Value: 4, 5, or 6 dry; 4 or 5 moist

Chroma: 1 or 2

Texture: clay, silty clay

Clay content: 50 to 60 percent

Rock fragments: 0 to 20 percent shale fragments—
0 to 5 percent hard shale, 0 to 15 percent soft shale

Electrical conductivity: 2 to 4 mmhos/cm

Calcium carbonate equivalent: 2 to 12 percent

Reaction: pH 7.4 to 8.4

Bky horizon

Hue: 2.5Y or 5Y

Value: 4, 5, or 6 dry; 4 or 5 moist

Chroma: 1 or 2

Texture: clay, silty clay

Clay content: 50 or 60 percent

Rock fragments: 5 to 30 percent shale fragments—
0 to 5 percent hard shale, 5 to 25 percent soft shale

Electrical conductivity: 2 to 4 mmhos/cm

Calcium carbonate equivalent: 5 to 15 percent

Gypsum content: 1 to 3 percent

Reaction: pH 7.4 to 8.4

641F—Norbert-Barkof silty clays, 25 to 60 percent slopes

Setting

Landform:

* Norbert—Hills

* Barkof—Hills

Position on landform:

* Norbert—Backslopes and shoulders

* Barkof—Backslopes and footslopes

Slope:

* Norbert—25 to 60 percent

* Barkof—25 to 45 percent

Mean annual precipitation: 14 to 17 inches

Frost-free period: 100 to 120 days

Composition

Major Components

Norbert and similar soils: 45 percent

Barkof and similar soils: 40 percent

Minor Components

Very deep, clayey soils: 0 to 5 percent

Areas of rock outcrop: 0 to 3 percent

Noncalcareous soils: 0 to 3 percent

Soils with clay loam profiles: 0 to 2 percent

Slopes less than 25 percent: 0 to 2 percent

Major Component Description

Norbert

Surface layer texture: Silty clay

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Dominant parent material: Shale residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 2.7 inches

Barkof

Surface layer texture: Silty clay

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Shale residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 3.6 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Pendroy Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Very slow (<0.06 inch/hour)

Landform: Lake plains

Parent material: Glaciolacustrine deposits

Slope range: 0 to 2 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Very-fine, montmorillonitic, frigid
Chromic Udic Haplusterts

Typical Pedon

Pendroy clay, 0 to 2 percent slopes, in cropland, 2,500 feet west and 2,450 feet south of the northeast corner of sec. 34, T. 23 N., R. 3 E.

Ap—0 to 5 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; strong very fine and fine granular structure; hard, firm, very sticky and very plastic; many very fine and fine roots; slightly effervescent; mildly alkaline; abrupt smooth boundary.

Bss1—5 to 14 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; moderate fine angular blocky structure; extremely hard, firm, very sticky and very plastic; common very fine and fine roots; common very fine tubular pores; 1- to 3-inch wide vertical cracks that are 6 to 18 inches apart; well expressed slickensides on all surfaces of cracks that intersect at 30 to 60 degree angles; slightly effervescent; moderately alkaline; gradual wavy boundary.

Bss2—14 to 30 inches; light brownish gray (2.5Y 6/2) clay, dark grayish brown (2.5Y 4/2) moist; weak coarse angular blocky structure; extremely hard, very firm, very sticky and very plastic; common very fine and fine roots; few very fine tubular pores; 1/2-inch wide vertical cracks that are 6 to 18 inches apart; well expressed slickensides on all surfaces of cracks that intersect at 30 to 60 degree angles; slightly effervescent; moderately alkaline; gradual wavy boundary.

Bss3—30 to 44 inches; light brownish gray (2.5Y 6/2) clay, dark grayish brown (2.5Y 4/2) moist; massive; extremely hard, very firm, very sticky and very plastic; few very fine roots; few very fine tubular pores; well expressed slickensides on all surfaces of cracks that intersect at 30 to 60 degree angles; slightly effervescent; moderately alkaline; gradual wavy boundary.

BCy—44 to 60 inches; light brownish gray (2.5Y 6/2) silty clay, dark grayish brown (2.5Y 4/2) moist; massive; very hard, firm, very sticky and very

plastic; few very fine roots; few very fine pores; few fine and medium masses of gypsum; slightly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 60 to 75 percent

Ap horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 or 3

Clay content: 60 to 75 percent

Electrical conductivity: 0 to 4 mmhos/cm

Reaction: pH 7.4 to 8.4

Bss horizons

Hue: 10YR or 2.5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2, 3, or 4

Texture: clay, silty clay

Clay content: 60 to 75 percent

Electrical conductivity: 2 to 4 mmhos/cm

Reaction: pH 7.4 to 8.4

BCy horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2, 3, or 4

Texture: silty clay, clay

Clay content: 50 to 65 percent

Electrical conductivity: 2 to 4 mmhos/cm

Gypsum content: 2 to 6 percent

Reaction: pH 7.9 to 8.4

43A—Pendroy clay, 0 to 2 percent slopes

Setting

Landform: Lake plains

Slope: 0 to 2 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Pendroy and similar soils: 85 percent

Minor Components

Kobase and similar soils: 0 to 6 percent

Ethridge and similar soils: 0 to 5 percent

Slopes more than 2 percent: 0 to 3 percent

Poorly drained soils: 0 to 1 percent

Major Component Description

Surface layer texture: Clay

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Glaciolacustrine deposits

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.1 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Perma Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Somewhat excessively drained

Permeability: Moderate (0.6 to 2.0 inches/hour) to 28 inches, below this depth moderately rapid (2.0 to 6.0 inches/hour)

Landform: Mountains, alluvial fans

Parent material: Colluvium or alluvium from igneous rocks

Slope range: 2 to 70 percent

Annual precipitation: 17 to 22 inches

Annual air temperature: 41 to 44 degrees F

Frost-free period: 90 to 110 days

Taxonomic Class: Loamy-skeletal, mixed Typic Haploborolls

Typical Pedon

Perma cobbly loam, in an area of Perma-Whitlash complex, 25 to 70 percent slopes, in rangeland, 1,450 feet north and 1,400 feet east of the southwest corner of sec. 5, T. 28 N., R. 15 E.

A1—0 to 7 inches; very dark grayish brown (10YR 3/2) cobbly loam, black (10YR 2/1) moist; strong fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; many very fine and fine pores; 15 percent cobbles; neutral; clear wavy boundary.

A2—7 to 15 inches; dark grayish brown (10YR 4/2) very cobbly loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine pores; 20 percent pebbles, 15 percent cobbles; neutral; clear wavy boundary.

Bw1—15 to 28 inches; light brownish gray (10YR 6/2) very cobbly loam, dark grayish brown (10YR 4/2) moist; weak fine subangular structure; slightly hard, friable, sticky and plastic; common very fine and fine roots; common very fine and fine pores; 30 percent pebbles, 25 percent cobbles; neutral; gradual wavy boundary.

Bw2—28 to 42 inches; light brownish gray (2.5Y 6/2) extremely cobbly loam, dark grayish brown (2.5Y 4/2) moist; weak fine subangular blocky structure; slightly hard, friable, sticky and plastic; many very fine and fine roots; common very fine and fine pores; 30 percent pebbles, 50 percent cobbles; neutral; clear wavy boundary.

BC—42 to 60 inches; light gray (2.5Y 7/2) extremely cobbly loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine and fine pores; disseminated lime; 30 percent pebbles, 50 percent cobbles; many distinct lime casts on underside of fragments; strongly effervescent; mildly alkaline.

Range in Characteristics

Mollic epipedon thickness: 10 to 15 inches

Content of clay in the control section: 7 to 20 percent

A horizons

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 2 or 3

Clay content: 7 to 20 percent

Rock fragments: 15 to 60 percent—0 to 30 percent cobbles, stones, and boulders; 10 to 50 percent pebbles

Reaction: pH 6.6 to 7.3

Bw horizons

Hue: 2.5Y, 10YR, or 7.5YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2, 3, or 4

Texture: loam, sandy loam

Clay content: 7 to 27 percent

Rock fragments: 35 to 85 percent—0 to 50 percent cobbles and stones, 25 to 65 percent pebbles

Reaction: pH 6.6 to 7.8

BC horizon

Hue: 2.5Y, 10YR, or 7.5YR

Value: 6 or 7 dry, 4 or 5 moist

Chroma: 2, 3, or 4

Texture: loam, loamy sand, sandy loam

Clay content: 0 to 15 percent

Rock fragments: 60 to 85 percent—10 to 50

percent cobbles and stones, 50 to 65 percent pebbles

Reaction: pH 6.6 to 7.8

88C—Perma gravelly loam, 2 to 8 percent slopes

Setting

Landform: Alluvial fans

Slope: 2 to 8 percent

Mean annual precipitation: 17 to 19 inches

Frost-free period: 90 to 110 days

Composition

Major Components

Perma and similar soils: 85 percent

Minor Components

Hedoes and similar soils: 0 to 7 percent

Flaggy surface layers: 0 to 3 percent

Very cobbly surface layers: 0 to 2 percent

Slopes more than 8 percent: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.5 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

883F—Perma-Whitlash complex, 25 to 70 percent slopes

Setting

Landform:

* Perma—Mountains

* Whitlash—Mountains

Position on landform:

* Perma—Backslopes and footslopes

* Whitlash—Backslopes and shoulders

Slope:

* Perma—25 to 70 percent

* Whitlash—25 to 70 percent

Mean annual precipitation: 17 to 22 inches

Frost-free period: 90 to 110 days

Composition

Major Components

Perma and similar soils: 50 percent

Whitlash and similar soils: 35 percent

Minor Components

Belain and similar soils: 0 to 3 percent

Very stony surface layers: 0 to 3 percent

Douglas-fir or ponderosa pine: 0 to 3 percent

Hedoes and similar soils: 0 to 2 percent

Very deep, sandy soils: 0 to 2 percent

Areas of rock outcrop: 0 to 2 percent

Major Component Description

Perma

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Igneous colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 3.8 inches

Whitlash

Surface layer texture: Very cobbly loam

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Dominant parent material: Igneous residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 1.2 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Phillips Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Slow (0.06 to 0.2 inch/hour)

Landform: Till plains

Parent material: Glacial till

Slope range: 0 to 8 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Fine, montmorillonitic Typic
Eutroboralfs

Typical Pedon

Phillips loam, in an area of Phillips-Elloam complex, 0 to 4 percent slopes, in cropland, 1,600 feet north and 1,500 feet east of the southwest corner of sec. 24, T. 28 N., R. 12 E.

Ap—0 to 4 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; moderate very fine and fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; slightly acid; clear smooth boundary.

E—4 to 8 inches; pale brown (10YR 6/3) loam, dark brown (10YR 4/3) moist; moderate fine and medium prismatic structure; hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine tubular pores; neutral; abrupt smooth boundary.

Bt—8 to 15 inches; brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; strong fine and medium prismatic structure parting to moderate fine subangular blocky; very hard, firm, sticky and plastic; many very fine and fine roots; common very fine tubular pores; many distinct clay films on faces of peds; mildly alkaline; clear wavy boundary.

Bk1—15 to 24 inches; light brownish gray (2.5Y 6/2) clay loam, grayish brown (2.5Y 5/2) moist; moderate fine and medium subangular blocky structure; very hard, firm, sticky and plastic; common fine and many very fine roots; many very fine tubular pores; many fine masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk2—24 to 32 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; weak fine and medium subangular blocky structure; very hard, firm, sticky and plastic; few very fine roots; many very fine tubular pores;

common fine masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bck—32 to 60 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; massive; very hard, firm, sticky and plastic; many very fine tubular pores; few fine masses of lime; strongly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 35 to 45 percent
Depth to the Bk horizon: 12 to 20 inches

Ap horizon

Hue: 10YR or 2.5Y

Value: 5 dry, 3 or 4 moist

Chroma: 2 or 3

Clay content: 15 to 27 percent

Rock fragments: 0 to 15 percent—0 to 5 percent cobbles, 0 to 10 percent pebbles

Reaction: pH 6.1 to 7.3

E horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 or 3

Texture: loam, sandy loam

Clay content: 15 to 27 percent

Rock fragments: 0 to 15 percent—0 to 5 percent cobbles, 0 to 10 percent pebbles

Reaction: pH 6.1 to 7.3

Some pedons have an E/B horizon

Bt horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 or 3

Texture: clay loam, clay

Clay content: 35 to 45 percent

Rock fragments: 0 to 15 percent—0 to 5 percent cobbles, 0 to 10 percent pebbles

Electrical conductivity: 0 to 2 mmhos/cm

Reaction: pH 6.6 to 8.4

Bk1, Bk2, and Bck horizons

Hue: 10YR or 2.5Y

Value: 5, 6, or 7 dry; 4 or 5 moist

Chroma: 2, 3, or 4

Texture: loam, clay loam

Clay content: 25 to 40 percent

Rock fragments: 0 to 15 percent—0 to 5 percent cobbles, 0 to 10 percent pebbles

Electrical conductivity: 0 to 8 mmhos/cm
 Calcium carbonate equivalent: 5 to 15 percent
 Sodium adsorption ratio: 0 to 13
 Reaction: pH 7.4 to 8.4

33A—Phillips loam, 0 to 2 percent slopes

Setting

Landform: Till plains
Slope: 0 to 2 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Phillips and similar soils: 85 percent

Minor Components

Kevin and similar soils: 0 to 5 percent
 Elloam and similar soils: 0 to 4 percent
 Thoeny and similar soils: 0 to 3 percent
 Slopes more than 2 percent: 0 to 3 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.5 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

331B—Phillips-Elloam complex, 0 to 4 percent slopes

Setting

Landform:
 * Phillips—Till plains
 * Elloam—Till plains

Position on landform:

- * Phillips—Microhighs
- * Elloam—Microlows

Slope:

- * Phillips—0 to 4 percent
- * Elloam—0 to 4 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Phillips and similar soils: 55 percent
 Elloam and similar soils: 30 percent

Minor Components

Absher and similar soils: 0 to 6 percent
 Kevin and similar soils: 0 to 6 percent
 Soils with shale substratums: 0 to 2 percent
 Nishon and similar soils: 0 to 1 percent

Major Component Description

Phillips

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.5 inches

Elloam

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 6.6 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

331C—Phillips-Elloam complex, 4 to 8 percent slopes

Setting

Landform:

- * Phillips—Till plains
- * Elloam—Till plains

Position on landform:

- * Phillips—Microhighs
- * Elloam—Microlows

Slope:

- * Phillips—4 to 8 percent
- * Elloam—4 to 8 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Phillips and similar soils: 55 percent
Elloam and similar soils: 30 percent

Minor Components

Absher and similar soils: 0 to 8 percent
Hillon and similar soils: 0 to 6 percent
Nishon and similar soils: 0 to 1 percent

Major Component Description

Phillips

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.5 inches

Elloam

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 6.6 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

334B—Phillips-Kevin complex, 0 to 4 percent slopes

Setting

Landform:

- * Phillips—Till plains
- * Kevin—Till plains

Position on landform:

- * Phillips—Footslopes and toeslopes
- * Kevin—Backslopes and shoulders

Slope:

- * Phillips—0 to 2 percent
- * Kevin—0 to 4 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Phillips and similar soils: 50 percent
Kevin and similar soils: 35 percent

Minor Components

Hillon and similar soils: 0 to 8 percent
Elloam and similar soils: 0 to 6 percent
Nishon and similar soils: 0 to 1 percent

Major Component Description

Phillips

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.5 inches

Kevin

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)

Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.1 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Reeder Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Hills
Parent material: Interbedded sandstone and shale residuum
Slope range: 8 to 25 percent
Annual precipitation: 15 to 19 inches
Annual air temperature: 41 to 45 degrees F
Frost-free period: 90 to 115 days

Taxonomic Class: Fine-loamy, mixed Typic Argiborolls

Typical Pedon

Reeder loam, in an area of Farnuf-Reeder loams, 4 to 15 percent slopes, in rangeland, 1,600 feet south and 2,500 feet east of the northwest corner of sec. 9, T. 20 N., R. 11 E.

A—0 to 7 inches; very dark grayish brown (10YR 3/2) loam, very dark brown (10YR 2/2) moist; strong fine and medium granular structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine and few medium roots; neutral; clear smooth boundary.

Bt—7 to 12 inches; brown (10YR 4/3) clay loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to strong fine and medium subangular blocky; hard, firm, sticky and plastic; common very fine and fine and few medium roots; common very fine tubular pores; common distinct clay films on faces of peds; neutral; clear smooth boundary.

Bk1—12 to 20 inches; light brownish gray (2.5Y 6/2) clay loam, light olive brown (2.5Y 5/4) moist; weak

medium prismatic structure parting to moderate fine subangular blocky; hard, friable, slightly sticky and slightly plastic; common very fine roots and few fine roots; many very fine tubular pores; common fine masses and threads of lime; strongly effervescent; mildly alkaline; clear wavy boundary.

Bk2—20 to 34 inches; pale yellow (2.5Y 7/4) clay loam, light olive brown (2.5Y 5/4) moist; moderate fine and medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; many fine and medium masses and threads of lime; violently effervescent; mildly alkaline; gradual wavy boundary.

Cr—34 to 60 inches; pale yellow (2.5Y 7/4) platy sandstone, light olive brown (2.5Y 5/4) moist; slightly effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 16 inches (may include all or part of the Bt horizon)

Content of clay in the control section: 18 to 35 percent

Depth to the Bk horizon: 10 to 26 inches

Depth to the Cr horizon: 20 to 40 inches

A horizon

Hue: 10YR or 2.5Y
 Value: 3, 4, or 5 dry; 2 or 3 moist
 Chroma: 2 or 3
 Clay content: 15 to 27 percent
 Reaction: pH 6.1 to 7.8

Bt horizon

Hue: 7.5YR, 10YR, or 2.5Y
 Value: 4, 5, or 6 dry; 3, 4, or 5 moist
 Chroma: 2 to 4
 Texture: loam, sandy clay loam, clay loam
 Clay content: between 20 and 30 percent, but ranges from 18 to 35 percent and from 20 to 45 percent fine sand and coarser
 Reaction: pH 6.6 to 7.8

Bk horizons

Hue: 10YR, 2.5Y, or 5Y
 Value: 5, 6, 7, or 8 dry; 4, 5, or 6 moist
 Chroma: 2, 3, or 4
 Texture: loam, silt loam, silty clay loam, clay loam, sandy clay loam
 Clay content: 15 to 30 percent
 Calcium carbonate equivalent: 6 to 20 percent
 Reaction: pH 7.4 to 8.4

411E—Reeder-Farnuf loams, 8 to 25 percent slopes

Setting

Landform:

- * Reeder—Hills
- * Farnuf—Hills

Position on landform:

- * Reeder—Backslopes and shoulders
- * Farnuf—Footslopes

Slope:

- * Reeder—15 to 25 percent
- * Farnuf—8 to 15 percent

Mean annual precipitation: 17 to 19 inches

Frost-free period: 90 to 110 days

Composition

Major Components

Reeder and similar soils: 50 percent
Farnuf and similar soils: 35 percent

Minor Components

Cabba and similar soils: 0 to 3 percent
Vebar and similar soils: 0 to 3 percent
Stony surface layers: 0 to 3 percent
Tally and similar soils: 0 to 2 percent
Whitlash and similar soils: 0 to 2 percent
Areas of rock outcrop: 0 to 2 percent

Major Component Description

Reeder

Surface layer texture: Loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Interbedded sandstone and shale residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.6 inches

Farnuf

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

2—Riverwash

Setting

Landform: Flood plains

Composition

Major Components

Riverwash: 85 percent

Minor Components

Areas that frequently flood: 0 to 10 percent
Poorly drained soils: 0 to 5 percent

Major Component Description

Definition: Unstabilized areas of sandy, silty, clayey, or gravelly sediments

Rivra Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Rapid (6.0 to 20.0 inches/hour)

Landform: Flood plains

Parent material: Alluvium

Slope range: 0 to 2 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Sandy-skeletal, mixed, frigid Aridic Ustifluvents

Typical Pedon

Rivra sandy loam, in an area of Rivra-Hanly complex, 0 to 2 percent slopes, in woodland, 600 feet east and 2,100 feet south of the northwest corner of sec. 18, T. 24 N., R. 8 E.

A1—0 to 2 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable, slightly

sticky and slightly plastic; common very fine, fine and coarse roots; 5 percent pebbles; slightly effervescent; mildly alkaline; abrupt smooth boundary.

- A2—2 to 6 inches; brown (10YR 5/3) sandy loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few coarse roots; many very fine and fine pores; 5 percent pebbles; slightly effervescent; mildly alkaline; clear wavy boundary.
- C1—6 to 15 inches; pale brown (10YR 6/3) extremely gravelly sand, dark grayish brown (10YR 4/2) moist; single grain; loose, nonsticky and nonplastic; common very fine and fine roots; many fine pores; 15 percent cobbles, 50 percent pebbles; slightly effervescent; mildly alkaline; gradual wavy boundary.
- C2—15 to 60 inches; pale brown (10YR 6/3) extremely gravelly sand, brown (10YR 4/3) moist; single grain; loose, nonsticky and nonplastic; few very fine and fine roots in the upper 20 inches; many very fine pores; 10 percent cobbles, 60 percent pebbles; slightly effervescent; mildly alkaline.

Range in Characteristics

Content of clay in the control section: 0 to 5 percent
Rock fragments in the control section: 55 to 80 percent

A horizons

Hue: 10YR or 2.5Y
 Value: 5, 6, or 7 dry; 4 or 5 moist
 Chroma: 2 or 3
 Clay content: 5 to 15 percent
 Rock fragments: 0 to 35 percent—0 to 10 percent stones and cobbles, 0 to 25 percent pebbles
 Reaction: pH 6.6 to 8.4

C horizons

Hue: 10YR or 2.5Y
 Value: 5, 6, or 7 dry; 4 or 5 moist
 Chroma: 2 or 3
 Texture: sand, loamy coarse sand that consists of stratification of these and some finer sands
 Clay content: 0 to 5 percent
 Rock fragments: 55 to 80 percent—10 to 20 percent stones and cobbles, 45 to 70 percent pebbles
 Reaction: pH 7.4 to 8.4

99—Rivra-Hanly complex, 0 to 2 percent slopes

Setting

Landform:

- * Rivra—Flood plains
- * Hanly—Flood plains

Slope:

- * Rivra—0 to 2 percent
- * Hanly—0 to 2 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Rivra and similar soils: 50 percent
 Hanly and similar soils: 35 percent

Minor Components

Glendive and similar soils: 0 to 3 percent
 Soils in rangeland: 0 to 3 percent
 Poorly drained soils: 0 to 3 percent
 Havre and similar soils: 0 to 2 percent
 Very gravelly surface layers: 0 to 2 percent
 Areas of riverwash: 0 to 2 percent

Major Component Description

Rivra

Surface layer texture: Sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Forest land
Flooding: Occasional
Available water capacity: Mainly 2.2 inches

Hanly

Surface layer texture: Loamy sand
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Alluvium
Native plant cover type: Forest land
Flooding: Occasional
Available water capacity: Mainly 5.7 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

510—Rock outcrop-Belain complex, 15 to 45 percent slopes

Setting

Landform:

- * Rock outcrop—Escarpments
- * Belain—Hills

Slope:

- * Belain—15 to 45 percent

Mean annual precipitation: 15 to 19 inches

Frost-free period: 90 to 110 days

Composition

Major Components

Rock outcrop: 45 percent
Belain and similar soils: 40 percent

Minor Components

Whitlash and similar soils: 0 to 5 percent
Very stony surface layers: 0 to 5 percent
Hedoes and similar soils: 0 to 3 percent
Perma and similar soils: 0 to 2 percent

Major Component Description

Rock outcrop

Definition: Exposures of igneous bedrock

Belain

Surface layer texture: Sandy loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Igneous residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.0 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

410—Rock outcrop-Fleak complex, 25 to 70 percent slopes

Setting

Landform:

- * Rock outcrop—Escarpments
- * Fleak—Hills

Slope:

- * Fleak—25 to 70 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Rock outcrop: 55 percent
Fleak and similar soils: 30 percent

Minor Components

Twilight and similar soils: 0 to 5 percent
Limber pine, rocky mountain juniper: 0 to 5 percent
Cabbart and similar soils: 0 to 3 percent
Yamacall and similar soils: 0 to 2 percent

Major Component Description

Rock outcrop

Definition: Exposures of sandstone bedrock

Fleak

Surface layer texture: Loamy fine sand
Depth class: Shallow (10 to 20 inches)
Drainage class: Excessively drained
Dominant parent material: Sandstone residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.2 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Roy Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained

Permeability: Moderately slow (0.2 to 0.6 inch/hour)

Landform: Alluvial fans, relict stream terraces

Parent material: Alluvium

Slope range: 2 to 25 percent

Annual precipitation: 14 to 19 inches

Annual air temperature: 41 to 44 degrees F

Frost-free period: 90 to 110 days

Taxonomic Class: Clayey-skeletal, mixed Typic
Argiborolls

Typical Pedon

Roy stony loam, in an area of Work-Roy complex, 8 to 25 percent slopes, in rangeland, 2,200 feet west and 100 feet south of the northeast corner of sec. 5, T. 20 N., R. 8 E.

A—0 to 7 inches; dark grayish brown (10YR 4/2) stony loam, very dark brown (10YR 2/2) moist; strong medium granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine and common medium roots; 10 percent stones, 10 percent cobbles, and 5 percent pebbles; neutral; clear smooth boundary.

Bt—7 to 15 inches; dark grayish brown (10YR 4/2) very cobbly clay loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; very hard, friable, sticky and plastic; many very fine and fine and common medium roots; common very fine tubular pores; common distinct clay films on faces of peds; 2 percent stones, 20 percent cobbles, and 25 percent pebbles; neutral; clear wavy boundary.

BC1—15 to 38 inches; brown (10YR 5/3) very cobbly sandy clay loam, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; many fine and very fine tubular and irregular pores; 25 percent cobbles, 30 percent pebbles; mildly alkaline; gradual wavy boundary.

BC2—38 to 60 inches; brown (10YR 5/3) extremely cobbly sandy clay loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine tubular and irregular pores; 35 percent cobbles, 35 percent pebbles; mildly alkaline.

Range in Characteristics

Mollic epipedon thickness: 10 to 16 inches

Content of clay in the control section: 35 to 50 percent

Rock fragments in the control section: 35 to 80 percent

A horizon

Hue: 7.5YR or 10YR

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 2 or 3

Texture: loam, clay loam

Clay content: 15 to 40 percent

Rock fragments: 5 to 55 percent—5 to 30 percent stones and cobbles, 0 to 25 percent pebbles

Reaction: pH 6.1 to 7.8

Bt horizon

Hue: 7.5YR or 10YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2, 3, or 4

Texture: clay loam, clay

Clay content: 35 to 50 percent

Rock fragments: 35 to 80 percent—20 to 50 percent stones and cobbles, 15 to 30 percent pebbles

Reaction: pH 6.6 to 7.8

BC horizons

Hue: 7.5YR through 2.5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 3, 4, or 5

Texture: clay loam, sandy clay loam

Clay content: 27 to 40 percent

Rock fragments: 35 to 80 percent—20 to 50 percent stones and cobbles, 15 to 30 percent pebbles

Reaction: pH 7.4 to 8.4

71D—Roy very cobbly clay loam, 2 to 15 percent slopes

Setting

Landform: Relict stream terraces

Slope: 2 to 15 percent

Mean annual precipitation: 14 to 17 inches

Frost-free period: 90 to 110 days

Composition

Major Components

Roy and similar soils: 85 percent

Minor Components

Stony surface layers: 0 to 5 percent
 Slopes less than 2 percent: 0 to 5 percent
 Moderately deep soils: 0 to 2 percent
 Loam or clay loam surfaces: 0 to 2 percent
 Poorly drained soils: 0 to 1 percent

Major Component Description

Surface layer texture: Very cobbly clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.1 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Sagedale Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Alluvial fans, stream terraces, small drainageways, hills
Parent material: Alluvium
Slope range: 0 to 45 percent
Annual precipitation: 14 to 17 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 100 to 120 days

Taxonomic Class: Fine, montmorillonitic, frigid Typic Ustochrepts

Typical Pedon

Sagedale silty clay loam, 0 to 4 percent slopes, in rangeland, 1,100 feet west and 300 feet south of the northeast corner of sec. 8, T. 21 N., R. 10 E.

A—0 to 4 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; moderate fine subangular blocky structure parting to moderate fine granular; hard, firm, sticky and plastic; common fine and medium roots; mildly alkaline; clear smooth boundary.

Bw—4 to 15 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist;

moderate fine and medium subangular blocky structure; very hard, firm, very sticky and very plastic; common fine and very fine roots; common very fine tubular pores; slightly effervescent; moderately alkaline; clear wavy boundary.

Bk—15 to 30 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; weak coarse subangular blocky structure; very hard, firm, very sticky and very plastic; few fine roots; common very fine tubular pores; few fine seams and masses of lime; slightly effervescent; moderately alkaline; gradual wavy boundary.

BCky—30 to 60 inches; grayish brown (2.5Y 5/2) silty clay, very dark grayish brown (2.5Y 3/2) moist; massive; very hard, firm, very sticky and very plastic; few very fine tubular pores; few fine seams and masses of lime and gypsum; slightly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 35 to 45 percent
Depth to the Bk horizon: 10 to 15 inches
Depth to the BCky horizon: 17 to 36 inches

A horizon

Hue: 10YR or 2.5Y
 Value: 5 or 6 dry, 4 moist
 Chroma: 2, 3, or 4
 Clay content: 30 to 40 percent
 Reaction: pH 7.4 to 8.4

Bw horizon

Hue: 10YR or 2.5Y
 Value: 5 or 6 dry, 4 moist
 Chroma: 2, 3, or 4
 Texture: silty clay loam, silty clay, clay loam
 Clay content: 32 to 45 percent
 Reaction: pH 7.4 to 8.4

Bk horizon

Hue: 10YR or 2.5Y
 Value: 5 or 6 dry, 4 or 5 moist
 Chroma: 2, 3, or 4
 Texture: silty clay loam, silty clay
 Clay content: 35 to 45 percent
 Calcium carbonate equivalent: 5 to 15 percent
 Reaction: pH 7.4 to 8.4

BCky horizon

Hue: 10YR, 2.5Y, 5Y, or N
 Value: 4, 5, or 6 dry; 3, 4, or 5 moist
 Chroma: 0, 2, 3, or 4
 Texture: silty clay loam, clay, silty clay, clay loam

Clay content: 35 to 45 percent
 Calcium carbonate equivalent: 5 to 10 percent
 Electrical conductivity: less than 4 mmhos/cm
 Gypsum content: 1 to 7 percent
 Reaction: pH 7.9 to 9.0

323B—Sagedale silty clay loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans, stream terraces, and drainageways
Slope: 0 to 4 percent
Mean annual precipitation: 14 to 17 inches
Frost-free period: 100 to 120 days

Composition

Major Components

Sagedale and similar soils: 85 percent

Minor Components

Sagedale clay or silty clay: 0 to 5 percent
 Macar and similar soils: 0 to 3 percent
 Calcareous surface layers: 0 to 3 percent
 Moderately saline/sodic soils: 0 to 2 percent
 Sandy or gravelly substratums: 0 to 2 percent

Major Component Description

Surface layer texture: Silty clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

323C—Sagedale silty clay loam, 4 to 8 percent slopes

Setting

Landform: Alluvial fans
Slope: 4 to 8 percent

Mean annual precipitation: 14 to 17 inches
Frost-free period: 100 to 120 days

Composition

Major Components

Sagedale and similar soils: 85 percent

Minor Components

Macar and similar soils: 0 to 5 percent
 Calcareous surface layers: 0 to 5 percent
 Sandy or gravelly substratums: 0 to 3 percent
 Moderately saline/sodic soils: 0 to 2 percent

Major Component Description

Surface layer texture: Silty clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

621E—Sagedale-Wayden silty clay loams, 8 to 25 percent slopes

Setting

Landform:
 * Sagedale—Hills
 * Wayden—Hills
Position on landform:
 * Sagedale—Footslopes
 * Wayden—Backslopes and shoulders
Slope:
 * Sagedale—8 to 25 percent
 * Wayden—8 to 25 percent
Mean annual precipitation: 14 to 17 inches
Frost-free period: 100 to 120 days

Composition

Major Components

Sagedale and similar soils: 50 percent
 Wayden and similar soils: 35 percent

Minor Components

Macar and similar soils: 0 to 5 percent
 Cabba and similar soils: 0 to 4 percent
 Very gravelly soils: 0 to 3 percent
 Areas of rock outcrop: 0 to 2 percent
 Poorly drained soils (slumps): 0 to 1 percent

Major Component Description

Sagedale

Surface layer texture: Silty clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.4 inches

Wayden

Surface layer texture: Silty clay loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.9 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Savage Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Alluvial fans, stream terraces, drainageways
Parent material: Glaciofluvial deposits
Slope range: 0 to 8 percent
Annual precipitation: 14 to 17 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 100 to 120 days

Taxonomic Class: Fine, montmorillonitic Typic Argiborolls

Typical Pedon

Savage silty clay loam, 0 to 4 percent slopes, in cropland, 1,300 feet south and 1,600 feet east of the northwest corner of sec. 32, T. 23 N., R. 8 E.

Ap—0 to 6 inches; grayish brown (10YR 5/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium granular structure; soft, very friable, sticky and plastic; many very fine and fine roots; neutral; clear smooth boundary.

Bt1—6 to 11 inches; grayish brown (10YR 5/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; weak medium and coarse prismatic structure parting to strong fine and medium subangular blocky; hard, friable, sticky and plastic; many very fine and fine roots; common very fine tubular pores; common distinct clay films on faces of peds; neutral; clear wavy boundary.

Bt2—11 to 16 inches; light brownish gray (10YR 6/2) silty clay loam, dark grayish brown (10YR 4/2) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; hard, firm, sticky and plastic; common very fine and fine roots; few very fine tubular pores; common distinct clay films on faces of peds; mildly alkaline; gradual wavy boundary.

Bk1—16 to 22 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure parting to weak fine and medium subangular blocky; hard, firm, sticky and plastic; common very fine and fine roots; few very fine tubular pores; few fine masses of lime; slightly effervescent; mildly alkaline; gradual wavy boundary.

Bk2—22 to 30 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak fine and medium subangular blocky structure; hard, firm, sticky and plastic; few very fine roots; common very fine tubular pores; many fine and medium masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

BCk—30 to 60 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; massive; few very fine roots; few very fine tubular pores; hard, firm, sticky and plastic; common fine masses of lime; strongly effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 8 to 16 inches and may include all or part of the Bt horizon

Content of clay in the control section: 35 to 50 percent

Depth to water table (moderately wet phase): 48 to 72 inches

Depth to the Bk horizon: 12 to 22 inches

Soil phases: Moderately wet

A horizon

Hue: 7.5YR, 10YR, or 2.5Y

Value: 3, 4, or 5 dry; 2 or 3 moist

Chroma: 2 or 3

Texture: loam, silty clay loam

Clay content: 20 to 35 percent

Rock fragments: 0 to 5 percent pebbles

Reaction: pH 6.1 to 7.8

Bt1 and Bt2 horizons

Hue: 7.5YR, 10YR, or 2.5Y

Value: 3, 4, 5, or 6 dry; 2, 3, or 4 moist

Chroma: 2, 3, or 4

Texture: silty clay loam, silty clay, clay

Clay content: 35 to 50 percent

Rock fragments: 0 to 5 percent pebbles

Electrical conductivity: 0 to 4 mmhos/cm

Reaction: pH 6.1 to 8.4

A Btk horizon 4 to 18 inches thick is allowed.

Bk and BCK horizons

Hue: 7.5YR through 5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2, 3, or 4

Texture: silty clay loam, silty clay, clay

Clay content: 30 to 45 percent

Rock fragments: 0 to 10 percent—0 to 5 percent cobbles, 0 to 10 percent pebbles

Calcium carbonate equivalent: 5 to 15 percent

Electrical conductivity: 0 to 4 mmhos/cm; moderately wet phase is 4 to 16 mmhos/cm

Reaction: pH 7.4 to 8.4

Some pedons have C and By horizons below a depth of 36 inches.

The Savage soil in map unit 828A is a taxadjunct to the series because it has interfingering of albic materials into the argillic horizon. It classifies as fine, montmorillonitic Boralfic Argiborolls.

828A—Savage loam, 0 to 2 percent slopes**Setting**

Landform: Alluvial fans, stream terraces, and drainageways

Slope: 0 to 2 percent

Mean annual precipitation: 14 to 17 inches

Frost-free period: 100 to 120 days

Composition**Major Components**

Savage and similar soils: 85 percent

Minor Components

Acel and similar soils: 0 to 5 percent

Moderately saline soils: 0 to 5 percent

Moderately well drained soils: 0 to 3 percent

Somewhat poorly drained soils: 0 to 2 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Glaciofluvial deposits

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

82B—Savage silty clay loam, 0 to 4 percent slopes**Setting**

Landform: Alluvial fans, stream terraces, and drainageways

Slope: 0 to 4 percent

Mean annual precipitation: 14 to 17 inches

Frost-free period: 100 to 120 days

Composition**Major Components**

Savage and similar soils: 85 percent

Minor Components

Farnuf and similar soils: 0 to 3 percent

Savage loam: 0 to 3 percent

Calcareous surface layers: 0 to 3 percent

Saline and sodic soils: 0 to 2 percent

Acel and similar soils: 0 to 2 percent
Slopes of 4 to 8 percent: 0 to 2 percent

Major Component Description

Surface layer texture: Silty clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciofluvial deposits
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.1 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

842A—Savage-Daglum complex, 0 to 2 percent slopes

Setting

Landform:

- * Savage—Alluvial fans, stream terraces, and drainageways
- * Daglum—Alluvial fans, stream terraces, and drainageways

Position on landform:

- * Savage—Microhighs
- * Daglum—Microlows

Slope:

- * Savage—0 to 2 percent
- * Daglum—0 to 2 percent

Mean annual precipitation: 14 to 17 inches

Frost-free period: 100 to 120 days

Composition

Major Components

Savage and similar soils: 60 percent
Daglum and similar soils: 25 percent

Minor Components

Strongly saline/sodic soils: 0 to 7 percent
Somewhat poorly drained soils: 0 to 5 percent
Poorly drained soils: 0 to 3 percent

Major Component Description

Savage

Surface layer texture: Silty clay loam

Depth class: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Dominant parent material: Glaciofluvial deposits
Native plant cover type: Rangeland
Flooding: None
Water table: Apparent
Available water capacity: Mainly 8.6 inches

Daglum

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Dominant parent material: Glaciofluvial deposits
Native plant cover type: Rangeland
Flooding: None
Water table: Apparent
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 7.9 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Scobey Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Till plains, hills
Parent material: Glacial till
Slope range: 0 to 15 percent
Annual precipitation: 11 to 14 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 105 to 125 days

Taxonomic Class: Fine, montmorillonitic Aridic Argiborolls

Typical Pedon

Scobey clay loam, in an area of Scobey-Kevin clay loams, 0 to 4 percent slopes, in cropland, 800 feet east and 250 feet north of the southwest corner of sec. 20, T. 26 N., R. 10 E.

Ap—0 to 6 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, friable, sticky and plastic; common

very fine roots; slightly acid; abrupt smooth boundary.

Bt—6 to 15 inches; brown (10YR 5/3) clay, dark brown (10YR 3/3) moist; moderate fine prismatic structure parting to moderate medium subangular blocky; hard, friable, sticky and plastic; common very fine roots; common very fine tubular pores; many distinct clay films on faces of peds; neutral; clear wavy boundary.

Bk1—15 to 29 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium prismatic structure parting to moderate fine and medium subangular blocky; hard, friable, sticky and plastic; many very fine roots; common very fine tubular pores; many fine and medium masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk2—29 to 43 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; moderate fine and medium subangular blocky structure; hard, firm, sticky and plastic; few very fine roots; common very fine tubular pores; common fine and medium masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

BCky—43 to 60 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, sticky and plastic; common very fine tubular pores; few fine masses of lime and gypsum; slightly effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 15 inches and may include all or part of the Bt horizon

Content of clay in the control section: 35 to 45 percent

Depth to the Bk horizon: 10 to 20 inches

Ap horizon

Hue: 10YR or 2.5Y

Chroma: 2 or 3

Texture: clay loam, fine sandy loam

Clay content: 10 to 35 percent

Rock fragments: 0 to 60 percent—0 to 25 percent cobbles and stones, trace to 40 percent pebbles

Reaction: pH 6.1 to 7.8

Pedons with sandy loam surfaces are in areas which have a thin sandy eolian mantle

Bt horizon

Hue: 10YR or 2.5Y

Value: 4, 5, or 6 dry; 3 or 4 moist

Chroma: 2 or 3

Texture: clay loam, clay

Clay content: 35 to 45 percent

Rock fragments: 0 to 15 percent—0 to 5 percent cobbles, trace to 10 percent pebbles

Reaction: pH 6.6 to 8.4

Bk1 and Bk2 horizons

Hue: 10YR or 2.5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2, 3, or 4

Clay content: 30 to 40 percent

Rock fragments: 0 to 15 percent—0 to 5 percent cobbles, trace to 10 percent pebbles

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.4 to 8.4

A Btk horizon is allowed

BCky horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 or 3

Clay content: 30 to 40 percent

Rock fragments: 0 to 15 percent—0 to 5 percent cobbles, trace to 10 percent pebbles

Calcium carbonate equivalent: 5 to 12 percent

Sodium adsorption ratio: 1 to 8

Gypsum content: 1 to 6 percent

Reaction: pH 7.4 to 9.0

56A—Scobey clay loam, 0 to 2 percent slopes

Setting

Landform: Till plains

Slope: 0 to 2 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Scobey and similar soils: 90 percent

Minor Components

Kevin and similar soils: 0 to 4 percent

Ethridge and similar soils: 0 to 2 percent

Acel and similar soils: 0 to 2 percent

Nishon and similar soils: 0 to 1 percent
Telstad and similar soils: 0 to 1 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.9 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

561B—Scobey-Kevin clay loams, 0 to 4 percent slopes

Setting

Landform:

- * Scobey—Till plains
- * Kevin—Till plains

Position on landform:

- * Scobey—Footslopes and toeslopes
- * Kevin—Backslopes and shoulders

Slope:

- * Scobey—0 to 4 percent
- * Kevin—0 to 4 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Scobey and similar soils: 55 percent
Kevin and similar soils: 30 percent

Minor Components

Hillon and similar soils: 0 to 7 percent
Elloam and similar soils: 0 to 3 percent
Acel and similar soils: 0 to 2 percent
Telstad and similar soils: 0 to 2 percent
Nishon and similar soils: 0 to 1 percent

Major Component Description

Scobey

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.9 inches

Kevin

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.1 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

561C—Scobey-Kevin clay loams, 4 to 8 percent slopes

Setting

Landform:

- * Scobey—Till plains
- * Kevin—Till plains

Position on landform:

- * Scobey—Footslopes
- * Kevin—Backslopes and shoulders

Slope:

- * Scobey—4 to 8 percent
- * Kevin—4 to 8 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Scobey and similar soils: 45 percent
Kevin and similar soils: 40 percent

Minor Components

Hillon and similar soils: 0 to 9 percent
 Acel and similar soils: 0 to 2 percent
 Elloam and similar soils: 0 to 2 percent
 Nishon and similar soils: 0 to 1 percent
 Telstad and similar soils: 0 to 1 percent

Major Component Description**Scobey**

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.9 inches

Kevin

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.1 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

562B—Scobey-Linnet complex, 0 to 4 percent slopes**Setting***Landform:*

- * Scobey—Till plains
- * Linnet—Till plains

Position on landform:

- * Scobey—Backslopes and footslopes
- * Linnet—Toeslopes

Slope:

- * Scobey—0 to 4 percent
- * Linnet—0 to 2 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition**Major Components**

Scobey and similar soils: 50 percent
 Linnet and similar soils: 35 percent

Minor Components

Acel and similar soils: 0 to 5 percent
 Kevin and similar soils: 0 to 5 percent
 Ethridge and similar soils: 0 to 2 percent
 Nishon and similar soils: 0 to 2 percent
 Hillon and similar soils: 0 to 1 percent

Major Component Description**Scobey**

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.9 inches

Linnet

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciofluvial deposits
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.6 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Shambo Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Alluvial fans, stream terraces, hills
Parent material: Alluvium
Slope range: 0 to 35 percent
Annual precipitation: 14 to 19 inches

Annual air temperature: 41 to 45 degrees F
Frost-free period: 90 to 120 days

Taxonomic Class: Fine-loamy, mixed Typic
 Haploborolls

Typical Pedon

Shambo loam, 2 to 8 percent slopes, in hayland, 1,800 feet north and 300 feet east of the southwest corner of sec. 4, T. 21 N., R. 10 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium granular structure; soft, very friable, slightly sticky and slightly plastic; common fine and very fine roots; neutral; abrupt smooth boundary.

Bw—6 to 15 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; hard, very friable, slightly sticky and slightly plastic; common fine and very fine roots; many very fine tubular pores; slightly effervescent; mildly alkaline; clear wavy boundary.

Bk1—15 to 25 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; weak medium prismatic structure parting to moderate medium subangular blocky; hard, very friable, sticky and plastic; common fine and very fine roots; many very fine tubular pores; common fine seams and masses of lime; strongly effervescent; moderately alkaline; clear wavy boundary.

Bk2—25 to 42 inches; light brownish gray (2.5Y 6/2) loam, grayish brown (2.5Y 5/2) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few fine roots; many very fine tubular pores; common fine seams and masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

BCK—42 to 60 inches; light brownish gray (2.5Y 6/2) loam with lenses of clay loam and fine sandy loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; many very fine tubular pores; few fine seams and masses of lime; strongly effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 16 inches
Content of clay in the control section: 18 to 35 percent
Depth to the Bk horizon: 14 to 20 inches

A horizon

Hue: 10YR
 Value: 3, 4, or 5 dry; 2 or 3 moist
 Chroma: 2 or 3
 Clay content: 18 to 27 percent
 Reaction: pH 6.6 to 7.8.

Bw horizon

Hue: 10YR or 2.5Y
 Value: 4, 5, or 6 dry; 3 or 4 moist
 Chroma: 2, 3, or 4
 Texture: loam, silt loam, clay loam; typically averages 15 to 45 percent fine sand and coarser
 Clay content: 18 to 35 percent
 Reaction: pH 6.6 to 8.4

Bk and BCK horizons

Hue: 10YR, 2.5Y, or 5Y
 Value: 5, 6, or 7 dry; 4, 5, or 6 moist
 Chroma: 2, 3, or 4
 Texture: loam, clay loam, silty clay loam, silt loam
 Clay content: 18 to 35 percent
 Calcium carbonate equivalent: 5 to 20 percent
 Reaction: pH 7.4 to 9.0
 Some pedons have a BCK horizon

74C—Shambo loam, 2 to 8 percent slopes

Setting

Landform: Alluvial fans
Slope: 2 to 8 percent
Mean annual precipitation: 14 to 17 inches
Frost-free period: 100 to 120 days

Composition

Major Components

Shambo and similar soils: 85 percent

Minor Components

Tally and similar soils: 0 to 5 percent
 Savage and similar soils: 0 to 5 percent
 Very gravelly soils: 0 to 3 percent
 Areas that occasionally flood: 0 to 1 percent
 Somewhat poorly drained soils: 0 to 1 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 10.9 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

745F—Shambo-Amor-Cabba loams, 15 to 45 percent slopes

Setting

Landform:

- * Shambo—Hills
- * Amor—Hills
- * Cabba—Hills

Position on landform:

- * Shambo—Footslopes
- * Amor—Backslopes
- * Cabba—Shoulders and summits

Slope:

- * Shambo—15 to 35 percent
- * Amor—15 to 45 percent
- * Cabba—15 to 45 percent

Mean annual precipitation: 17 to 19 inches

Frost-free period: 90 to 110 days

Composition

Major Components

Shambo and similar soils: 35 percent
 Amor and similar soils: 30 percent
 Cabba and similar soils: 20 percent

Minor Components

Tally and similar soils: 0 to 5 percent
 Cohagen and similar soils: 0 to 2 percent
 Areas of rock outcrop: 0 to 2 percent
 Whitlash and similar soils: 0 to 2 percent
 Absarokee and similar soils: 0 to 2 percent
 Stony surface layers: 0 to 2 percent

Major Component Description

Shambo

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 10.9 inches

Amor

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Interbedded sandstone and shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.7 inches

Cabba

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Interbedded sandstone and shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.5 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

741B—Shambo-Straw loams, 0 to 4 percent slopes

Setting

Landform:

- * Shambo—Alluvial fans and stream terraces
- * Straw—Flood plains

Slope:

- * Shambo—0 to 4 percent
- * Straw—0 to 2 percent

Mean annual precipitation: 14 to 17 inches
Frost-free period: 100 to 120 days

Composition

Major Components

Shambo and similar soils: 45 percent
 Straw and similar soils: 40 percent

Minor Components

Tally and similar soils: 0 to 5 percent
 Nesda and similar soils: 0 to 2 percent
 Slopes more than 4 percent: 0 to 2 percent
 Sandy or gravelly substratum: 0 to 2 percent
 Somewhat poorly drained soils: 0 to 2 percent
 Poorly drained soils: 0 to 2 percent

Major Component Description

Shambo

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 10.9 inches

Straw

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Available water capacity: Mainly 9.1 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Shane Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Permeability: Very slow (<0.06 inch/hour)
Landform: Sedimentary plains, hills

Parent material: Residuum from shale
Slope range: 2 to 25 percent
Annual precipitation: 17 to 19 inches
Annual air temperature: 41 to 44 degrees F
Frost-free period: 90 to 110 days

Taxonomic Class: Fine, montmorillonitic Abruptic Argiborolls

Typical Pedon

Shane clay loam, in an area of Shane-Gerber complex, 2 to 8 percent slopes, in cropland, 500 feet north and 700 feet east of the southwest corner of sec. 18, T. 20 N., R. 8 E.

Ap—0 to 7 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; strong fine granular structure; slightly hard, very friable, sticky and plastic; many fine and very fine roots; moderately acid; abrupt smooth boundary.

Bt1—7 to 12 inches; brown (10YR 5/3) clay, dark brown (10YR 3/3) moist; strong fine and medium subangular blocky structure; very hard, firm, very sticky and very plastic; many fine and very fine roots; few very fine tubular pores; many faint clay films of faces of peds; slightly acid; clear wavy boundary.

Bt2—12 to 18 inches; grayish brown (10YR 5/2) clay, dark grayish brown (10YR 4/2) moist; strong fine and medium subangular blocky structure; extremely hard, very firm, very sticky and very plastic; common fine and very fine roots; few very fine tubular pores; many faint clay films of faces of peds; mildly alkaline; gradual wavy boundary.

Bk—18 to 36 inches; grayish brown and yellowish brown (10YR 5/2 and 5/4) clay loam, dark gray to dark yellowish brown (10YR 4/1 to 4/6) moist; moderate thick platy structure; very hard, friable, sticky and plastic; few fine and very fine roots; common very fine tubular pores; many fine seams and masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Cr—36 to 60 inches; gray and yellowish brown (10YR 5/1 and 5/4) shale with thin lenses of sandstone, dark grayish brown and dark yellowish brown (10YR 4/2 and 4/4) moist; common fine and medium masses of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 15 inches (may include the Bt1 horizon)

Content of clay in the control section: 45 to 60 percent

Depth to the Bk horizon: 13 to 26 inches

Depth to the Cr horizon: 20 to 40 inches

Ap horizon

Hue: 10YR or 2.5Y

Value: 4 or 5 dry, 3 moist

Clay content: 27 to 35 percent

Reaction: pH 5.6 to 7.3

Bt1 horizon

Hue: 10YR or 2.5Y

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2 or 3

Texture: clay, silty clay

Clay content: 45 to 60 percent

Reaction: pH 6.1 to 7.3

Bt2 horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 or 3

Texture: clay, silty clay

Clay content: 45 to 60 percent

Reaction: pH 6.6 to 7.8

Bk horizon

Hue: 10YR, 2.5Y or 5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 0 to 6

Texture: clay loam, clay, silty clay

Clay content: 35 to 55 percent

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.9 to 8.4

210E—Shane-Barkof-Gerber complex, 8 to 25 percent slopes

Setting

Landform:

* Shane—Hills

* Barkof—Hills

* Gerber—Hills

Position on landform:

* Shane—Backslopes and footslopes

* Barkof—Backslopes and shoulders

* Gerber—Footslopes

Slope:

* Shane—8 to 25 percent

* Barkof—8 to 25 percent

* Gerber—8 to 15 percent

Mean annual precipitation: 17 to 19 inches

Frost-free period: 90 to 110 days

Composition

Major Components

Shane and similar soils: 40 percent

Barkof and similar soils: 25 percent

Gerber and similar soils: 25 percent

Minor Components

Norbert and similar soils: 0 to 5 percent

Loam surface layers: 0 to 5 percent

Major Component Description

Shane

Surface layer texture: Clay loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Shale residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.9 inches

Barkof

Surface layer texture: Clay

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Shale residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.9 inches

Gerber

Surface layer texture: Clay

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.6 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

210C—Shane-Gerber complex, 2 to 8 percent slopes

Setting

Landform: (fig. 5)

- * Shane—Sedimentary plains
- * Gerber—Sedimentary plains

Slope:

- * Shane—2 to 8 percent
- * Gerber—2 to 8 percent

Mean annual precipitation: 17 to 19 inches

Frost-free period: 90 to 110 days

Composition

Major Components

- Shane and similar soils: 60 percent
- Gerber and similar soils: 30 percent

Minor Components

- Barkof and similar soils: 0 to 3 percent
- Acel and similar soils: 0 to 3 percent
- Norbert and similar soils: 0 to 2 percent
- Loamy surface layers: 0 to 2 percent

Major Component Description

Shane

Surface layer texture: Clay loam

Depth class: Moderately deep (20 to 40 inches)



Figure 5. Typical area of Shane-Gerber complex, 2 to 8 percent slopes in the foreground. The mountains in the background are typical of Libeg-Arrowpeak-Elkner complex, 25 to 70 percent slopes.

Drainage class: Well drained
Dominant parent material: Shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.9 inches

Gerber

Surface layer texture: Clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.6 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Straw Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour) to 42 inches, below this depth moderately rapid (2.0 to 6.0 inches/hour)
Landform: Flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Annual precipitation: 14 to 19 inches
Annual air temperature: 41 to 45 degrees F
Frost-free period: 90 to 120 days

Taxonomic Class: Fine-loamy, mixed Cumulic Haploborolls

Typical Pedon

Straw loam, in an area of Shambo-Straw loams, 0 to 4 percent slopes, in rangeland, 2,200 feet north and 350 feet west of the southeast corner of sec. 33, T. 28 N., R. 14 E.

A1—0 to 8 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and medium roots; neutral; clear wavy boundary.

A2—8 to 20 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; strong fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine, fine and medium roots; many very fine tubular pores; mildly alkaline; clear wavy boundary.

Bk1—20 to 30 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and very fine roots; many very fine tubular pores; few fine threads and masses of lime; slightly effervescent; mildly alkaline; clear wavy boundary.

Bk2—30 to 42 inches; light brownish gray (10YR 6/2) loam, grayish brown (10YR 5/2) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; few fine masses of lime; slightly effervescent; mildly alkaline; abrupt wavy boundary.

2C—42 to 60 inches; grayish brown (10YR 5/2) sandy loam, dark grayish brown (10YR 4/2) moist; single grain; loose, nonsticky and nonplastic; mildly alkaline.

Range in Characteristics

Mollic epipedon thickness: 16 to 40 inches
Content of clay in the control section: 20 to 35 percent
Depth to the 2C horizon: 40 to 60 inches
Soil phases: Rarely flooded, occasionally flooded

A horizons

Hue: 10YR or 2.5Y
 Value: 3 or 4 dry, 2 or 3 moist
 Chroma: 2 or 3
 Clay content: 10 to 27 percent with less than 15 to 35 percent fine and coarser sand
 Rock fragments: 0 to 10 percent pebbles
 Calcium carbonate equivalent: 0 to 5 percent
 Reaction: pH 6.6 to 8.4

Bk horizons

Hue: 10YR or 2.5Y
 Value: 4, 5, or 6 dry; 3, 4, or 5 moist
 Chroma: 2, 3, or 4
 Texture: loam, silt loam, silty clay loam, clay loam
 Clay content: 18 to 35 percent with less than 15 to 35 percent fine and coarser sand

Rock fragments: 0 to 10 percent pebbles
 Calcium carbonate equivalent: 3 to 15 percent
 Reaction: pH 6.6 to 8.4

2C horizon

Hue: 10YR or 2.5Y
 Value: 5, 6, or 7 dry; 4, 5, or 6 moist
 Chroma: 2 or 3
 Texture: stratified clay loam to loamy sand but mainly sandy loam or loamy sand
 Clay content: 5 to 35 percent
 Rock fragments: 0 to 10 percent pebbles
 Calcium carbonate equivalent: 2 to 12 percent
 Reaction: pH 7.4 to 8.4

Sunburst Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Hills, escarpments
Parent material: Glacial till
Slope range: 8 to 70 percent
Annual precipitation: 11 to 14 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 105 to 125 days

Taxonomic Class: Fine, montmorillonitic (calcareous), frigid Aridic Ustorthents

Typical Pedon

Sunburst clay loam, in an area of Sunburst-Lambeth complex, 25 to 70 percent slopes, in rangeland, 800 feet west and 1,000 feet south of the northeast corner of sec. 17, T. 21 N., R. 6 E.

A—0 to 4 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; moderate fine and medium granular structure; slightly hard, firm, very sticky and very plastic; many fine roots; strongly effervescent; mildly alkaline; clear wavy boundary.

Bk1—4 to 9 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; moderate fine and medium subangular blocky structure; hard, firm, very sticky and very plastic; common very fine and fine roots; many very fine tubular pores; few fine masses of lime; strongly effervescent; moderately alkaline; gradual smooth boundary.

Bk2—9 to 25 inches; light brownish gray (2.5Y 6/2) clay, dark grayish brown (2.5Y 4/2) moist; moderate fine and medium subangular blocky structure; hard, firm, very sticky and very plastic; few very fine roots; many very fine tubular pores; common fine and medium masses of lime; strongly effervescent; moderately alkaline; gradual smooth boundary.

Bky—25 to 60 inches; light brownish gray (2.5Y 6/2) clay, dark grayish brown (2.5Y 4/2) moist; weak fine and medium subangular blocky structure, hard, firm, very sticky and very plastic; common very fine tubular pores; common fine and medium masses of lime; few fine masses of gypsum; strongly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 35 to 50 percent

A horizon

Hue: 10YR or 2.5Y
 Value: 5 or 6 dry, 4 or 5 moist
 Chroma: 2 or 3
 Clay content: 35 to 40 percent
 Rock fragments: 2 to 60 percent—2 to 50 percent pebbles, 0 to 10 percent cobbles
 Reaction: pH 7.4 to 8.4

Bk horizons

Hue: 2.5Y or 5Y
 Value: 5, 6, or 7 dry; 4, 5, or 6 moist
 Chroma: 2 or 3
 Texture: clay, clay loam, silty clay loam
 Clay content: 35 to 50 percent
 Rock fragments: 0 to 15 percent—0 to 5 percent cobbles, 0 to 10 percent pebbles
 Calcium carbonate equivalent: 5 to 15 percent
 Reaction: pH 7.9 to 8.4

Bky horizon

Hue: 2.5Y or 5Y
 Value: 5, 6, or 7 dry; 4, 5, or 6 moist
 Chroma: 2 or 3
 Texture: clay, clay loam, silty clay
 Clay content: 35 to 50 percent
 Rock fragments: 0 to 15 percent—0 to 5 percent cobbles, 0 to 10 percent pebbles
 Calcium carbonate equivalent: 5 to 15 percent
 Gypsum content: 1 to 3 percent
 Reaction: pH 7.4 to 9.0

92E—Sunburst-Bascovy complex, 8 to 25 percent slopes

Setting

Landform:

- * Sunburst—Hills
- * Bascovy—Hills

Position on landform:

- * Sunburst—Backslopes and shoulders
- * Bascovy—Footslopes

Slope:

- * Sunburst—8 to 25 percent
- * Bascovy—8 to 25 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Sunburst and similar soils: 45 percent
Bascovy and similar soils: 40 percent

Minor Components

Neldore and similar soils: 0 to 10 percent
Saline and sodic soils: 0 to 5 percent

Major Component Description

Sunburst

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Till

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.2 inches

Bascovy

Surface layer texture: Silty clay

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Shale residuum

Native plant cover type: Rangeland

Flooding: None

Sodium affected: Sodic within 30 inches

Available water capacity: Mainly 4.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

925F—Sunburst-Lambeth complex, 25 to 70 percent slopes

Setting

Landform:

- * Sunburst—Escarpments
- * Lambeth—Escarpments

Position on landform:

- * Sunburst—Backslopes and footslopes
- * Lambeth—Backslopes and shoulders

Slope:

- * Sunburst—25 to 70 percent
- * Lambeth—25 to 70 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Sunburst and similar soils: 45 percent
Lambeth and similar soils: 40 percent

Minor Components

Cabbart and similar soils: 0 to 6 percent
Bascovy and similar soils: 0 to 5 percent
Tinsley and similar soils: 0 to 2 percent
Areas of rock outcrop: 0 to 2 percent

Major Component Description

Sunburst

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Till

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.2 inches

Lambeth

Surface layer texture: Silt loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Glaciolacustrine deposits
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 11.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Sweetgrass Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderately slow (0.2 to 0.6 inch/hour) and moderate (0.6 to 2.0 inch/hour) to 25 inches, below this depth rapid (6.0 to 20.0 inches/hour)
Landform: Relict stream terraces
Parent material: Alluvium
Slope range: 0 to 4 percent
Annual precipitation: 14 to 17 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 100 to 120 days

Taxonomic Class: Clayey over sandy or sandy-skeletal, montmorillonitic Typic Argiborolls

Typical Pedon

Sweetgrass clay loam, in an area of Sweetgrass-Beaverton complex, 0 to 2 percent slopes, in cropland, 800 feet east and 600 feet north of the southwest corner of sec. 17, T. 26 N., R. 16 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; strong fine granular structure; slightly hard, very friable, sticky and plastic; many fine and very fine roots; 5 percent pebbles; neutral; abrupt smooth boundary.

Bt1—6 to 13 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to strong fine and medium subangular blocky; very hard, friable, sticky and plastic; many fine and very fine roots; common very fine tubular pores; many distinct clay films on faces of peds; 5 percent pebbles; neutral; clear wavy boundary.

Bt2—13 to 18 inches; brown (10YR 5/3) clay loam, brown (10YR 4/3) moist; moderate medium prismatic structure parting to strong fine and medium angular blocky; very hard, friable, sticky and plastic; common fine and very fine roots; common very fine tubular pores; many faint clay films on faces of peds; 10 percent pebbles, few cobbles; mildly alkaline; clear wavy boundary.

2Bk—18 to 25 inches; grayish brown (10YR 5/2) gravelly sandy loam, dark grayish brown (10YR 4/2) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; common fine and very fine roots; many very fine tubular and irregular pores; 20 percent pebbles, 10 percent cobbles; lime disseminated; violently effervescent; mildly alkaline; gradual wavy boundary.

3BCk—25 to 46 inches; grayish brown (10YR 5/2) very gravelly loamy sand, dark grayish brown (10YR 4/2) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; many fine and very fine irregular pores; 35 percent pebbles, 15 percent cobbles; lime disseminated and as coats on lower surfaces of rock fragments; violently effervescent; moderately alkaline; gradual wavy boundary.

3C—46 to 60 inches; light brownish gray (10YR 6/2) extremely gravelly loamy sand, dark grayish brown (10YR 4/2) moist; single grain; loose, nonsticky and nonplastic; many fine and very fine irregular pores; 50 percent pebbles, 15 percent cobbles; lime disseminated; strongly effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 15 inches (may include Bt1 horizon)

Depth to the 2Bk horizon: 12 to 20 inches

Depth to the 3BCk horizon: 20 to 40 inches

A horizon

Hue: 10YR or 7.5YR

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 2 or 3

Clay content: 27 to 35 percent

Rock fragments: 0 to 25 percent—0 to 5 percent cobbles, 0 to 25 percent pebbles

Reaction: pH 6.6 to 7.8

Bt horizons

Hue: 10YR or 7.5YR

Value: 4, 5, or 6 dry; 3, 4, or 5 moist

Chroma: 2, 3, or 4

Texture: clay loam, clay

Clay content: 35 to 50 percent
 Rock fragments: 0 to 25 percent—0 to 5 percent
 cobbles, 0 to 25 percent pebbles
 Reaction: pH 6.6 to 7.8

2Bk horizon

Hue: 10YR or 2.5Y
 Value: 5, 6, 7, or 8 dry; 4, 5, 6, or 7 moist
 Chroma: 2, 3, or 4
 Texture: clay loam, sandy clay loam, loam, sandy
 loam
 Clay content: 10 to 30 percent
 Rock fragments: 5 to 35 percent—0 to 10 percent
 cobbles, 5 to 35 percent pebbles
 Calcium carbonate equivalent: 15 to 50 percent
 Reaction: pH 7.4 to 8.4

3BCK horizon

Hue: 10YR or 2.5Y
 Value: 5, 6, or 7 dry; 4, 5, or 6 moist
 Chroma: 2, 3, or 4
 Texture: loamy sand, loamy coarse sand, coarse
 sand, sand
 Clay content: 0 to 15 percent
 Rock fragments: 35 to 80 percent—0 to 15 percent
 stones, 5 to 25 percent cobbles, 30 to 50 percent
 pebbles
 Calcium carbonate equivalent: 10 to 20 percent
 Reaction: pH 7.4 to 8.4

3C horizon

Hue: 10YR or 2.5Y
 Value: 5, 6, or 7 dry; 4, 5, or 6 moist
 Chroma: 2, 3, or 4
 Texture: loamy sand, loamy coarse sand, coarse
 sand, sand
 Clay content: 1 to 10 percent
 Rock fragments: 35 to 80 percent—0 to 15
 percent stones, 5 to 25 percent cobbles, 30
 to 50 percent pebbles
 Calcium carbonate equivalent: 5 to 10 percent
 Reaction: pH 7.4 to 8.4

531A—Sweetgrass-Beaverton complex, 0 to 2 percent slopes

Setting

Landform:

- * Sweetgrass—Relict stream terraces
- * Beaverton—Relict stream terraces

Position on landform:

- * Sweetgrass—Treads
- * Beaverton—Treads

Slope:

- * Sweetgrass—0 to 2 percent
- * Beaverton—0 to 2 percent

Mean annual precipitation: 14 to 17 inches

Frost-free period: 100 to 120 days

Composition

Major Components

Sweetgrass and similar soils: 60 percent
 Beaverton and similar soils: 30 percent

Minor Components

Turner and similar soils: 0 to 5 percent
 Martinsdale and similar soils: 0 to 5 percent

Major Component Description

Sweetgrass

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.8 inches

Beaverton

Surface layer texture: Very cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.9 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

531C—Sweetgrass-Beaverton complex, 2 to 8 percent slopes

Setting

Landform:

- * Sweetgrass—Relict stream terraces
- * Beaverton—Relict stream terraces
- * Beaverton—Relict stream terraces

Position on landform:

- * Sweetgrass—Treads
- * Beaverton—Treads
- * Beaverton—Treads

Slope:

- * Sweetgrass—2 to 4 percent
- * Beaverton—2 to 8 percent
- * Beaverton—2 to 8 percent

Mean annual precipitation: 14 to 17 inches*Frost-free period:* 100 to 120 days**Composition****Major Components**

Sweetgrass and similar soils: 50 percent
 Beaverton and similar soils: 20 percent
 Beaverton and similar soils: 20 percent

Minor Components

Martinsdale and similar soils: 0 to 5 percent
 Stony surface layers: 0 to 5 percent

Major Component Description**Sweetgrass**

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.8 inches

Beaverton

Surface layer texture: Very cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.9 inches

Beaverton

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Tally Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderately rapid (2.0 to 6.0 inches/hour)
Landform: Alluvial fans, stream terraces, small drainageways, hills
Parent material: Alluvium
Slope range: 2 to 45 percent
Annual precipitation: 14 to 17 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 100 to 120 days

Taxonomic Class: Coarse-loamy, mixed Typic Haploborolls

Typical Pedon

Tally fine sandy loam, in an area of Tally-Vebar fine sandy loams, 8 to 25 percent slopes, in rangeland, 2,800 feet south and 1,500 feet east of the northwest corner of sec. 36, T. 21 N., R. 12 E.

A—0 to 5 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; strong fine granular structure; soft, very friable, nonsticky and nonplastic; many fine and very fine roots and few medium roots; neutral; clear smooth boundary.

Bw1—5 to 13 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure; hard, very friable, nonsticky and nonplastic; common fine and very fine roots; many very fine and few fine tubular pores; neutral; clear wavy boundary.

Bw2—13 to 24 inches; grayish brown (10YR 5/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak medium prismatic structure parting to moderate medium subangular blocky; hard, very friable, nonsticky and nonplastic; common fine and very fine roots; many very fine and few fine tubular pores; neutral; clear wavy boundary.

Bk—24 to 35 inches; grayish brown (10YR 5/2) fine sandy loam dark grayish brown (10YR 4/2) moist; weak medium prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, nonsticky and nonplastic; few fine and very fine roots; many very fine tubular pores; few fine masses of lime; slightly effervescent; moderately alkaline; clear wavy boundary.

BCK—35 to 60 inches; light brownish gray (2.5Y 6/2) fine sandy loam, grayish brown (2.5Y 5/2) moist; massive, slightly hard, very friable, nonsticky and nonplastic; few fine and very fine roots; many very fine tubular pores; common fine seams and masses of lime; strongly effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 10 to 16 inches

Content of clay in the control section: 5 to 18 percent

Depth to the Bk horizon: 15 to 30 inches

A horizon

Hue: 2.5Y, 10YR, or 7.5YR

Value: 3, 4, or 5 dry; 2, 3, or 4 moist

Chroma: 2 or 3

Clay content: 10 to 20 percent

Rock fragments: 0 to 15 percent pebbles

Reaction: pH 6.1 to 7.8

Bw1 horizon

Hue: 7.5YR, 10YR, or 2.5Y

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 2 or 3

Texture: fine sandy loam, sandy loam

Clay content: 5 to 18 percent

Rock fragments: 0 to 15 percent pebbles

Reaction: pH 6.6 to 7.8

Bw2 horizon

Hue: 7.5YR, 10YR, or 2.5Y

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2 or 3

Texture: fine sandy loam, sandy loam

Clay content: 5 to 18 percent

Rock fragments: 0 to 15 percent pebbles

Reaction: pH 6.6 to 7.8

Bk and BCK horizons

Hue: 10YR, 2.5Y, 7.5YR

Value: 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 2, 3, or 4

Texture: loamy fine sand, loamy sand, fine sand, fine sandy loam, sandy loam

Clay content: 5 to 18 percent

Calcium carbonate equivalent: 5 to 15 percent

Rock fragments: 0 to 15 percent pebbles above 40 inches, 0 to 25 percent below 40 inches

Reaction: pH 7.4 to 8.4

The loamy fine sand, loamy sand, and fine sand occur at a depth of more than 20 inches; some pedons have glacial till at depths of 40 to 60 inches

943C—Tally fine sandy loam, 2 to 8 percent slopes

Setting

Landform: Alluvial fans, stream terraces, and drainageways

Slope: 2 to 8 percent

Mean annual precipitation: 14 to 17 inches

Frost-free period: 100 to 120 days

Composition

Major Components

Tally and similar soils: 85 percent

Minor Components

Shambo and similar soils: 0 to 5 percent

Very deep, sandy soils: 0 to 5 percent

Slopes less than 2 percent: 0 to 5 percent

Major Component Description

Surface layer texture: Fine sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.7 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

943F—Tally-Cohagen fine sandy loams, 25 to 60 percent slopes

Setting

Landform:

- * Tally—Hills
- * Cohagen—Hills

Position on landform:

- * Tally—Backslopes and footslopes
- * Cohagen—Backslopes and shoulders

Slope:

- * Tally—25 to 45 percent
- * Cohagen—25 to 60 percent

Mean annual precipitation: 14 to 17 inches

Frost-free period: 100 to 120 days

Composition

Major Components

Tally and similar soils: 45 percent
Cohagen and similar soils: 40 percent

Minor Components

Vebar and similar soils: 0 to 4 percent
Areas of rock outcrop: 0 to 3 percent
Amor and similar soils: 0 to 3 percent
Cabba and similar soils: 0 to 2 percent
Whitlash and similar soils: 0 to 2 percent
Tinsley and similar soils: 0 to 1 percent

Major Component Description

Tally

Surface layer texture: Fine sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.7 inches

Cohagen

Surface layer texture: Fine sandy loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Sandstone residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.6 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

943E—Tally-Vebar fine sandy loams, 8 to 25 percent slopes

Setting

Landform:

- * Tally—Hills
- * Vebar—Hills

Position on landform:

- * Tally—Footslopes
- * Vebar—Backslopes and shoulders

Slope:

- * Tally—8 to 25 percent
- * Vebar—8 to 25 percent

Mean annual precipitation: 14 to 17 inches

Frost-free period: 100 to 120 days

Composition

Major Components

Tally and similar soils: 50 percent
Vebar and similar soils: 35 percent

Minor Components

Cohagen and similar soils: 0 to 5 percent
Cabba and similar soils: 0 to 3 percent
Slopes more than 25 percent: 0 to 3 percent
Macar and similar soils: 0 to 2 percent
Areas of rock outcrop: 0 to 2 percent

Major Component Description

Tally

Surface layer texture: Fine sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.7 inches

Vebar

Surface layer texture: Fine sandy loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Sandstone residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.0 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Tamaneen Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderately slow (0.2 to 0.6 inch/hour) to 19 inches, moderate (0.6 to 2.0 inches/hour) from 19 to 29 inches, below this depth moderately rapid (2.0 to 6.0 inches/hour)

Landform: Relict stream terraces

Parent material: Alluvium

Slope range: 0 to 8 percent

Annual precipitation: 15 to 19 inches

Annual air temperature: 41 to 45 degrees F

Frost-free period: 90 to 120 days

Taxonomic Class: Fine, montmorillonitic Typic Argiborolls

Typical Pedon

Tamaneen clay loam, 0 to 4 percent slopes, in rangeland, 1,800 feet north and 150 feet east of the southwest corner of sec. 6, T. 20 N., R. 12 E.

A1—0 to 2 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, friable, slightly sticky and slightly plastic; many fine and coarse roots and common very fine roots; neutral; clear smooth boundary.

A2—2 to 5 inches; dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to moderate fine granular; slightly hard, friable, slightly sticky and slightly plastic; many fine and coarse roots and common very fine roots; many very fine pores; neutral; clear smooth boundary.

Bt1—5 to 9 inches; brown (10YR 4/3) clay loam, dark brown (10YR 3/3) moist; strong fine and medium prismatic structure parting to strong fine subangular blocky; hard, firm, sticky and plastic; common fine and very fine roots; many very fine tubular pores; common distinct clay films on faces of peds; neutral; clear smooth boundary.

Bt2—9 to 14 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, firm, sticky and plastic; common fine and very fine roots; common very fine tubular pores; common faint clay films on faces of peds; neutral; clear wavy boundary.

Bk—14 to 19 inches; white (10YR 8/2) clay loam, light brownish gray (10YR 6/2) moist; weak medium prismatic structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; many fine masses of lime and disseminated lime; violently effervescent; mildly alkaline; clear wavy boundary.

Bck—19 to 29 inches; white (10YR 8/2) gravelly clay loam, light brownish gray (10YR 6/2) moist; massive; slightly hard; very friable, slightly sticky and slightly plastic; 20 percent pebbles; disseminated lime; violently effervescent; moderately alkaline; clear wavy boundary.

2Bck—29 to 60 inches; white (10YR 8/2) extremely gravelly sandy loam, light brownish gray (10YR 6/2) moist; massive; soft, very friable, nonsticky and nonplastic; 50 percent pebbles, 20 percent cobbles; disseminated lime; violently effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 8 to 15 inches

Content of clay in the control section: 35 to 50 percent

Depth to the calcic horizon: 11 to 15 inches

Soil phases: Cobbly

A horizons

Hue: 10YR or 2.5Y

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 2 or 3

Clay content: 27 to 35 percent mixed

Rock fragments: 0 to 10 percent—0 to trace cobbles, 0 to 10 percent pebbles

Reaction: pH 6.6 to 7.8

Bt horizons

Hue: 10YR or 2.5Y
 Value: 4 or 5 dry, 3 or 4 moist
 Chroma: 2 or 3
 Texture: silty clay, silty clay loam, clay loam
 Clay content: 35 to 50 percent
 Rock fragments: 0 to 10 percent—0 to trace
 cobbles, 0 to 10 percent pebbles
 Reaction: pH 6.6 to 7.8

Bk and BCk horizons

Hue: 10YR or 2.5Y
 Value: 5, 6, 7, or 8 dry; 4, 5, or 6 moist
 Chroma: 2 or 3
 Texture: clay loam, silty clay, silty clay loam
 Clay content: 18 to 35 percent
 Rock fragments: 5 to 20 percent—0 to trace
 cobbles, 5 to 20 percent pebbles
 Calcium carbonate equivalent: 20 to 30 percent
 Reaction: pH 7.4 to 8.4

2BCk horizon

Hue: 10YR or 2.5Y
 Value: 6, 7, or 8 dry; 5, 6, or 7 moist
 Chroma: 2, 3, or 4
 Texture: clay loam or loam
 Clay content: 8 to 25 percent
 Rock fragments: 30 to 45 percent—0 to 10 percent
 cobbles, 30 to 35 percent pebbles
 Calcium carbonate equivalent: 25 to 40 percent
 Reaction: pH 7.9 to 8.4

87B—Tamaneen clay loam, 0 to 4 percent slopes**Setting**

Landform: Relict stream terraces (fig. 6)

Position on landform: Treads

Slope: 0 to 4 percent



Figure 6. Typical area of 87B Tamaneen clay loam, 0 to 4 percent slopes on a relict stream terrace in the foreground. Map units 510 Rock outcrop-Belain complex, 15 to 45 percent slopes and 560F Elve-Rock outcrop complex, 25 to 70 percent slopes are in the background. Square Butte provides excellent habitat for mountain goats and other wildlife.

Mean annual precipitation: 15 to 19 inches

Frost-free period: 90 to 120 days

Composition

Major Components

Tamaneen and similar soils: 85 percent

Minor Components

Sweetgrass and similar soils: 0 to 5 percent

Work and similar soils: 0 to 5 percent

Roy and similar soils: 0 to 3 percent

Very cobbly surface layers: 0 to 1 percent

Stony surface layers: 0 to 1 percent

Major Component Description

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

871B—Tamaneen cobbly clay loam, 0 to 4 percent slopes

Setting

Landform: Relict stream terraces

Position on landform: Treads

Slope: 0 to 4 percent

Mean annual precipitation: 15 to 19 inches

Frost-free period: 90 to 120 days

Composition

Major Components

Tamaneen and similar soils: 85 percent

Minor Components

Sweetgrass and similar soils: 0 to 5 percent

Calcareous surface layers: 0 to 5 percent

Very cobbly surface layers: 0 to 2 percent

Very stony surface layers: 0 to 1 percent

Roy and similar soils: 0 to 2 percent

Major Component Description

Surface layer texture: Cobbly clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.3 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

871C—Tamaneen cobbly clay loam, 4 to 8 percent slopes

Setting

Landform: Relict stream terraces

Position on landform: Treads

Slope: 4 to 8 percent

Mean annual precipitation: 15 to 19 inches

Frost-free period: 90 to 120 days

Composition

Major Components

Tamaneen and similar soils: 85 percent

Minor Components

Sweetgrass and similar soils: 0 to 3 percent

Calcareous surface layers: 0 to 3 percent

Very cobbly surface layers: 0 to 3 percent

Work and similar soils: 0 to 2 percent

Roy and similar soils: 0 to 2 percent

Slopes more than 8 percent: 0 to 2 percent

Major Component Description

Surface layer texture: Cobbly clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.3 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Tanna Series

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Permeability: Slow (0.06 to 0.2 inch/hour)

Landform: Till plains

Parent material: Residuum from shale

Slope range: 2 to 8 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Fine, montmorillonitic Aridic Argiborolls

Typical Pedon

Tanna clay loam, 2 to 8 percent slopes, in cropland, 300 feet south and 1,350 feet east of the northwest corner of sec. 36, T. 23 N., R. 4 E.

Ap—0 to 5 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine and very fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; slightly acid; clear smooth boundary.

Bt1—6 to 9 inches; grayish brown (10YR 5/2) clay loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, sticky and plastic; many fine and very fine roots; many very fine tubular pores; common distinct clay films on faces of peds; neutral; clear wavy boundary.

Bt2—9 to 14 inches; grayish brown (10YR 5/2) clay loam, dark brown (10YR 4/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, sticky and plastic; many fine and very fine roots; many very fine tubular pores; many distinct clay films on faces of peds; neutral; clear wavy boundary.

Bk—14 to 21 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; many very fine tubular pores; few thin clay films; common fine

masses of lime; strongly effervescent; mildly alkaline; gradual wavy boundary.

2Bk—21 to 28 inches; grayish brown (10YR 5/2) silty clay loam, dark grayish brown (10YR 4/2) moist; moderate thick platy structure; hard, friable, sticky and plastic; common fine and very fine roots; few very fine pores; 25 percent small shale fragments; few fine masses of lime; slightly effervescent; mildly alkaline; gradual wavy boundary.

2Cr—28 to 60 inches; gray (10YR 5/1) shale, dark gray (10YR 4/1) moist; slightly effervescent; neutral.

Range in Characteristics

Mollic epipedon thickness: 7 to 12 inches

Content of clay in the control section: 35 to 45 percent

Depth to the Bk horizon: 11 to 16 inches

Depth to the Cr horizon: 20 to 40 inches

Ap horizon

Hue: 10YR or 2.5Y

Value: 2 or 3 moist

Chroma: 2 or 3

Clay content: 27 to 35 percent

Rock fragments: 0 to 10 percent—0 to 5 percent cobbles, 0 to 5 percent channers

Reaction: pH 6.6 to 7.8

Bt horizons

Hue: 10YR or 2.5Y

Value: 3 or 4 moist

Chroma: 2 or 3

Texture: clay loam, silty clay loam, clay, or silty clay

Clay content: 35 to 50 percent

Rock fragments: 0 to 10 percent—0 to 5 percent cobbles, 0 to 5 percent channers

Electrical conductivity: less than 4 mmhos/cm

Reaction: pH 6.6 to 8.4

Bk horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 or 3

Texture: clay loam, silty clay loam, or clay

Clay content: 35 to 50 percent

Rock fragments: 0 to 10 percent—0 to 5 percent cobbles, 0 to 5 percent channers

Electrical conductivity: 2 to 4 mmhos/cm

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.4 to 8.4

2Bk horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 1, 2, 3, or 4

Texture: loam, clay loam, clay, or silty clay loam

Clay content: 35 to 50 percent

Rock fragments: 0 to 60 percent—0 to 5 percent

cobbles, 10 to 55 percent channers

Electrical conductivity: 2 to 4 mmhos/cm

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.4 to 8.4

Some pedons have a Bky horizon with few to common threads of gypsum

2Cr horizon

Material: semiconsolidated shale

13C—Tanna clay loam, 2 to 8 percent slopes

Composition

Major Components

Tanna and similar soils: 85 percent

Minor Components

Scobey and similar soils: 0 to 5 percent

Yawdim and similar soils: 0 to 5 percent

Hillon and similar soils: 0 to 3 percent

Slopes more than 8 percent: 0 to 2 percent

Major Component Description

Surface layer texture: Clay loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Till

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Telstad Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Slow (0.06 to 0.2 inch/hour)

Landform: Till plains

Parent material: Glacial till

Slope range: 0 to 8 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Fine-loamy, mixed Aridic Argiborolls

Typical Pedon

Telstad loam, in an area of Telstad-Joplin loams, 0 to 4 percent slopes, in rangeland, 500 feet west and 50 feet south of the northeast corner of sec. 36, T. 26 N., R. 7 E.

A—0 to 5 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many fine and very fine roots; neutral; clear smooth boundary.

Bt1—5 to 9 inches; brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; hard, friable, sticky and plastic; many fine and very fine roots; common very fine tubular pores; common faint clay films of faces of peds; neutral; clear wavy boundary.

Bt2—9 to 14 inches; brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; moderate coarse prismatic structure parting to moderate fine and medium subangular blocky; hard, very friable, slightly sticky and slightly plastic; many very fine and common fine roots; common very fine tubular pores; few faint clay films on faces of peds; neutral; clear wavy boundary.

Bk—14 to 23 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure parting to weak fine and medium subangular blocky; hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine tubular pores; common fine and medium masses and seams of lime; strongly effervescent; moderately alkaline; clear wavy boundary.

BCK—23 to 38 inches; light brownish gray (2.5Y 6/2) clay loam, grayish brown (2.5Y 5/2) moist; massive; hard, friable, sticky and slightly plastic; few very fine and fine roots; many very fine tubular pores; few fine masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

BC—38 to 60 inches; light brownish gray (2.5Y 6/2) loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common very fine tubular pores; slightly effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 12 inches

Content of clay in the control section: 25 to 35 percent

Depth to the Bk horizon: 10 to 16 inches

A horizon

Hue: 10YR or 2.5Y

Chroma: 2 or 3

Clay content: 18 to 27 percent

Rock fragments: 0 to 15 percent—0 to 5 percent cobbles, 0 to 10 percent pebbles

Reaction: pH 6.6 to 7.8

Bt horizons

Hue: 10YR or 2.5Y

Value: 4, 5, or 6 dry; 3, 4, or 5 moist

Chroma: 2 or 3

Texture: loam or clay loam

Clay content: 25 to 35 percent

Rock fragments: 0 to 10 percent—0 to 2 percent cobbles, 0 to 8 percent pebbles

Reaction: pH 6.6 to 8.4

Bk horizon

Hue: 10YR or 2.5Y

Value: 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 2 or 3

Texture: loam or clay loam

Clay content: 20 to 32

Rock fragments: 0 to 10 percent—0 to 2 percent cobbles, 0 to 8 percent pebbles

Electrical conductivity: 2 to 4 mmhos/cm

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.9 to 8.4

BCK horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 2, 3, or 4

Texture: loam or clay loam

Clay content: 20 to 32 percent

Rock fragments: 0 to 10 percent—0 to 2 percent cobbles, 0 to 8 percent pebbles

Calcium carbonate equivalent: 3 to 12 percent

Electrical conductivity: 2 to 4 mmhos/cm

Bulk density air dry: 1.7 or more

Reaction: pH 7.9 to 8.4

BC horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2, 3, or 4

Texture: loam or clay loam

Clay content: 20 to 32 percent

Rock fragments: 0 to 10 percent—0 to 2 percent cobbles, 0 to 8 percent pebbles

Electrical conductivity: 2 to 4 mmhos/cm

Gypsum content: 0 to 3 percent

Bulk density, air dry: 1.7 or more

Reaction: pH 7.9 to 9.0

50A—Telstad loam, 0 to 2 percent slopes

Setting

Landform: Till plains

Slope: 0 to 2 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Telstad and similar soils: 90 percent

Minor Components

Joplin and similar soils: 0 to 6 percent

Fortbenton and similar soils: 0 to 3 percent

Nishon and similar soils: 0 to 1 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Till

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.8 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

503B—Telstad-Joplin loams, 0 to 4 percent slopes**Setting***Landform:*

- * Telstad—Till plains
- * Joplin—Till plains

Position on landform:

- * Telstad—Foothills and toeslopes
- * Joplin—Backslopes and shoulders

Slope:

- * Telstad—0 to 4 percent
- * Joplin—0 to 4 percent

Mean annual precipitation: 11 to 14 inches*Frost-free period:* 105 to 125 days**Composition****Major Components**

Telstad and similar soils: 55 percent
Joplin and similar soils: 30 percent

Minor Components

Fortbenton and similar soils: 0 to 6 percent
Hillon and similar soils: 0 to 4 percent
Scobey and similar soils: 0 to 2 percent
Elloam and similar soils: 0 to 2 percent
Nishon and similar soils: 0 to 1 percent

Major Component Description**Telstad***Surface layer texture:* Loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Till*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 9.8 inches**Joplin***Surface layer texture:* Loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Till*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 9.4 inches**Management**

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

503C—Telstad-Joplin loams, 4 to 8 percent slopes**Setting***Landform:*

- * Telstad—Till plains
- * Joplin—Till plains

Position on landform:

- * Telstad—Foothills and toeslopes
- * Joplin—Backslopes and shoulders

Slope:

- * Telstad—4 to 8 percent
- * Joplin—4 to 8 percent

Mean annual precipitation: 11 to 14 inches*Frost-free period:* 105 to 125 days**Composition****Major Components**

Telstad and similar soils: 45 percent
Joplin and similar soils: 40 percent

Minor Components

Hillon and similar soils: 0 to 6 percent
Fortbenton and similar soils: 0 to 3 percent
Scobey and similar soils: 0 to 2 percent
Marmarth and similar soils: 0 to 2 percent
Nishon and similar soils: 0 to 1 percent
Elloam and similar soils: 0 to 1 percent

Major Component Description**Telstad***Surface layer texture:* Loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Till*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 9.8 inches

Joplin

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Till

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Thoeny Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Very slow (<0.06 inch/hour)

Landform: Till plains

Parent material: Glacial till

Slope range: 0 to 4 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Fine, montmorillonitic Typic Natriboralfs

Typical Pedon

Thoeny loam, in an area of Thoeny-Elloam-Absher complex, 0 to 4 percent slopes, in rangeland, 1,700 feet south and 2,400 feet east of the northwest corner of sec. 26, T. 25 N., R. 14 E.

A—0 to 3 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; moderate fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and very fine roots; neutral; clear smooth boundary.

E—3 to 6 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and very fine roots; many very fine tubular pores; neutral; abrupt smooth boundary.

Bt—6 to 14 inches; brown (10YR 5/3) clay loam, dark grayish brown (10YR 4/2) moist; strong coarse columnar structure; very hard, firm, sticky and plastic; common fine and very fine roots; common

very fine tubular pores; many distinct clay films on faces of peds; mildly alkaline; clear wavy boundary.

Bkn1—14 to 24 inches; light brownish gray (2.5Y 6/2) clay loam, grayish brown (2.5Y 5/2) moist; weak medium prismatic structure parting to moderate fine and medium subangular blocky; very hard, friable, sticky and plastic; common fine and very fine roots; common very fine tubular pores; few fine and medium masses of lime; strongly effervescent; moderately alkaline; clear wavy boundary.

Bkn2—24 to 34 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; weak fine and medium subangular blocky structure; very hard, friable, sticky and plastic; few fine and very fine roots; few very fine tubular pores; common fine masses of lime; strongly effervescent; strongly alkaline; gradual wavy boundary.

Bkny—34 to 60 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure; very hard, firm, sticky and plastic; few very fine tubular pores; few fine masses of lime; common fine and few medium masses of gypsum; strongly effervescent; strongly alkaline.

Range in Characteristics

Content of clay in the control section: 35 to 50 percent

Depth to the Bkn horizon: 12 to 16 inches

Depth to the Bkny horizon: 24 to 36 inches

A and E horizons

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 or 3

Clay content: 15 to 27 percent

Rock fragments: 0 to 15 percent—0 to 5 percent

cobbles and stones, 0 to 10 percent pebbles

Electrical conductivity: 0 to 4 mmhos/cm

Reaction: pH 5.6 to 7.8

Bt horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 or 3

Texture: clay, clay loam

Clay content: 35 to 50 percent

Sodium adsorption ratio: 5 to 20

Electrical conductivity: 4 to 8 mmhos/cm

Skeletans: unstained sand and silt grains range from very few to common faint on vertical faces of peds

Rock fragments: 0 to 15 percent—0 to 5 percent
cobbles and stones, 0 to 10 percent pebbles
Structure: strong to medium, columnar prismatic,
or blocky
Reaction: pH 7.4 to 9.0

Bkn horizons

Hue: 10YR or 2.5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2 or 3
Texture: clay, clay loam
Clay content: 35 to 50 percent
Rock fragments: 0 to 15 percent—0 to 5 percent
cobbles and stones, 0 to 10 percent pebbles
Electrical conductivity: 4 to 8 mmhos/cm
Sodium adsorption ratio: 13 to 25 or more
exchangeable magnesium plus sodium than
calcium plus exchange acidity
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.4 to 9.0

Bkny horizon

Hue: 2.5Y or 5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2 or 3
Clay content: 35 to 40 percent
Bulk density, air dry: 1.55 gr/ccm and greater
Rock fragments: 0 to 15 percent—0 to 5 percent
cobbles and stones, 0 to 10 percent pebbles
Electrical conductivity: 4 to 16 mmhos/cm
Sodium adsorption ratio: 13 to 25 or more
exchangeable magnesium plus sodium than
calcium plus exchange acidity
Gypsum content: 1 to 3 percent
Reaction: pH 7.9 to 9.0

521B—Thoeny-Elloam-Absher complex, 0 to 4 percent slopes

Setting

Landform:

- * Thoeny—Till plains
- * Elloam—Till plains
- * Absher—Till plains

Position on landform:

- * Thoeny—Microhighs
- * Elloam—Microlows
- * Absher—Microlows

Slope:

- * Thoeny—0 to 4 percent
- * Elloam—0 to 4 percent
- * Absher—0 to 4 percent

Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Thoeny and similar soils: 35 percent
Elloam and similar soils: 30 percent
Absher and similar soils: 25 percent

Minor Components

Phillips and similar soils: 0 to 5 percent
Hillon and similar soils: 0 to 3 percent
Weingart and similar soils: 0 to 1 percent
Tanna and similar soils: 0 to 1 percent

Major Component Description

Thoeny

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 7.6 inches

Elloam

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 6.6 inches

Absher

Surface layer texture: Clay
Depth class: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 4.1 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Tinsley Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Excessively drained

Permeability: Rapid (6.0 to 20.0 inches/hour)

Landform: Relict stream terraces

Parent material: Glacial outwash

Slope range: 2 to 45 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Sandy-skeletal, mixed, frigid Typic Ustorthents

Typical Pedon

Tinsley gravelly sandy loam, in an area of Attewan-Tinsley complex, 2 to 8 percent slopes, in rangeland, 2,100 feet west and 1,200 feet south of the northeast corner of sec. 6, T. 23 N., R. 8 E.

A—0 to 6 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 4/3) moist; weak fine granular structure; very soft, very friable, nonsticky and nonplastic; many fine roots; 5 percent cobbles, 15 percent pebbles; strongly effervescent; mildly alkaline; clear smooth boundary.

C—6 to 60 inches; pale brown (10YR 6/3) very gravelly sand, brown (10YR 5/3) moist; single grain; loose, nonsticky and nonplastic; 45 percent pebbles; 10 percent cobbles; slightly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 0 to 10 percent

Rock fragments in the control section: 35 to 70 percent

A horizon

Hue: 10YR or 2.5Y

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2, 3, or 4

Clay content: 5 to 10 percent

Rock fragments: 15 to 60 percent—0 to 10 percent stones and cobbles, 15 to 50 percent pebbles

Reaction: pH 6.6 to 7.8

C horizon

Hue: 10YR or 2.5Y

Value: 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 2, 3, or 4

Texture: sand or loamy sand

Clay content: 0 to 10 percent

Rock fragments: 35 to 70 percent—5 to 25 percent stones and cobbles, 30 to 45 percent pebbles

Reaction: pH 7.4 to 8.4.

77F—Tinsley gravelly sandy loam, 15 to 45 percent slopes

Setting

Landform: Relict stream terraces

Slope: 15 to 45 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Tinsley and similar soils: 85 percent

Minor Components

Busby and similar soils: 0 to 5 percent

Yetull and similar soils: 0 to 5 percent

Slopes more than 45 percent: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Excessively drained

Dominant parent material: Glacial outwash

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 1.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Toston Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Somewhat poorly drained

Permeability: Moderately slow (0.2 to 0.6 inch/hour)

and slow (0.06 to 0.2 inch/hour) to 16 inches, below this depth moderate (0.6 to 2.0 inches/hour)

Landform: Flood plains

Parent material: Alluvium

Slope range: 0 to 1 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F
Frost-free period: 105 to 125 days

Taxonomic Class: Fine-loamy, mixed Typic
 Natriboralfs

Typical Pedon

Toston clay loam, 0 to 1 percent slopes, in rangeland, 1,250 feet north and 1,900 feet east of the southwest corner of sec. 32, T. 29 N., R. 13 E.

E—0 to 3 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; strong medium granular structure; hard, very friable, sticky and plastic; common very fine and fine roots; mildly alkaline; abrupt smooth boundary.

Btn—3 to 9 inches; grayish brown (10YR 5/2) silty clay loam, dark grayish brown (10YR 4/2) moist; moderate medium columnar structure parting to strong fine subangular blocky; very hard, friable, sticky and plastic; common very fine and fine roots; many very fine tubular pores; common distinct clay films on faces of peds; moderately alkaline; clear smooth boundary.

Bknyz1—9 to 16 inches; light brownish gray (2.5Y 6/2) silty clay loam, grayish brown (2.5Y 5/2) moist; weak medium prismatic structure parting to moderate fine and medium subangular blocky; hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine, few fine tubular pores; few fine threads and masses of lime, gypsum and other salts; strongly effervescent; strongly alkaline; clear wavy boundary.

Bknyz2—16 to 32 inches; light brownish gray (2.5Y 6/2) silt loam with thin lenses of loam and fine sandy loam, grayish brown (2.5Y 5/2) moist; few fine and medium light yellowish brown and yellowish brown (10YR 6/4 and 5/4) mottles; massive; hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine tubular pores; few fine threads and masses of lime; common fine seams of gypsum and other salts; strongly effervescent; strongly alkaline; gradual wavy boundary.

Bnyz—32 to 60 inches; light brownish gray (2.5Y 6/2) silty clay loam with thin lenses of loam and fine sandy loam, grayish brown (2.5Y 5/2) moist; common fine and medium distinct light yellowish brown and brownish yellow (10YR 6/4 and 6/6) mottles; massive; very hard, friable, sticky and plastic; many very fine tubular pores; many fine

seams of gypsum and other salts; lime disseminated; strongly effervescent; strongly alkaline.

Range in Characteristics

Content of clay in the control section: 18 to 30 percent

Depth to water table: 36 to 60 inches

Depth to the Bknyz horizon: 6 to 20 inches

E horizon

Hue: 10YR or 2.5Y

Value: 4, 5, or 6 dry; 3, 4, or 5 moist

Chroma: 1, 2, or 3

Clay content: 18 to 35 percent

Electrical conductivity: 4 to 8 mmhos/cm

Reaction: pH 7.9 to 9.0

Btn horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry; 3, 4, or 5 moist

Chroma: 1, 2, or 3

Texture: silty clay, silty clay loam

Clay content: 35 to 45 percent with 15 to 35 percent sand coarser than very fine sand

Sodium adsorption ratio: 13 to 30

Electrical conductivity: 4 to 16 mmhos/cm

Gypsum content: 1 to 3 percent

Reaction: pH 7.9 to 9.0

Bknyz horizons

Hue: 10YR or 2.5Y

Value: 6 or 7 dry; 3, 4, or 5 moist

Chroma: 1, 2, or 3

Clay content: 27 to 35 percent with 15 to 35 percent sand coarser than very fine sand

Calcium carbonate equivalent: 5 to 15 percent

Sodium adsorption ratio: 13 to 30

Electrical conductivity: 8 to 16 mmhos/cm

Gypsum content: 1 to 5 percent

Reaction: pH 8.5 to 9.0

Bnyz horizon

Hue: 10YR or 2.5Y

Value: 6 or 7 dry; 3, 4, or 5 moist

Chroma: 1, 2, or 3

Texture: silt loam or silty clay loam stratified with silty clay, loam, loamy fine sand, or loamy sand

Clay content: 10 to 30 percent with 15 to 35 percent sand coarser than very fine sand

Mottles: faint to prominent and common to many

Rock fragments: 0 to 10 percent pebbles

Calcium carbonate equivalent: 2 to 15 percent

Electrical conductivity: 8 to 16 mmhos/cm

Reaction: pH 7.9 to 9.0

263A—Toston clay loam, 0 to 1 percent slopes

Setting

Landform: Flood plains

Slope: 0 to 1 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Toston and similar soils: 85 percent

Minor Components

Nobe and similar soils: 0 to 5 percent

Havre and similar soils: 0 to 5 percent

Poorly drained soils: 0 to 3 percent

Areas that occasionally flood: 0 to 2 percent

Major Component Description

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: Rare

Water table: Apparent

Salt affected: Saline within 30 inches

Sodium affected: Sodic within 30 inches

Available water capacity: Mainly 7.5 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

264A—Toston-Nobe complex, 0 to 1 percent slopes

Setting

Landform:

* Toston—Flood plains

* Nobe—Flood plains

Position on landform:

* Toston—Microlows

* Nobe—Microhighs

Slope:

* Toston—0 to 1 percent

* Nobe—0 to 1 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Toston and similar soils: 55 percent

Nobe and similar soils: 30 percent

Minor Components

Stratified sand to clay soils: 0 to 10 percent

Poorly drained soils: 0 to 3 percent

Areas that occasionally flood: 0 to 2 percent

Major Component Description

Toston

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: Rare

Water table: Apparent

Salt affected: Saline within 30 inches

Sodium affected: Sodic within 30 inches

Available water capacity: Mainly 7.5 inches

Nobe

Surface layer texture: Silty clay

Depth class: Very deep (more than 60 inches)

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: Rare

Water table: Apparent

Salt affected: Saline within 30 inches

Sodium affected: Sodic within 30 inches

Available water capacity: Mainly 4.2 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Turner Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour) to 34 inches, below this depth rapid (6.0 to 20.0 inches/hour)

Landform: Relict stream terraces

Parent material: Alluvium

Slope range: 0 to 4 percent

Annual precipitation: 14 to 17 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 100 to 120 days

Taxonomic Class: Fine-loamy over sandy or sandy-skeletal, mixed Typic Argiborolls

Typical Pedon

Turner loam, in an area of Turner-Beaverton complex, 2 to 8 percent slopes, in pasture, 1,200 feet north and 2,100 feet west of the southeast corner of sec. 23, T. 21 N., R. 7 E.

Ap—0 to 4 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; strong fine granular structure; soft, very friable, slightly sticky and slightly plastic; 5 percent pebbles; neutral; clear smooth boundary.

Bt1—4 to 11 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to strong fine and medium subangular blocky; hard, very friable, sticky and plastic; many fine and very fine roots; many very fine tubular pores; many distinct clay films on faces of peds; 5 percent pebbles; neutral; clear wavy boundary.

Bt2—11 to 16 inches; brown (10YR 5/3) clay loam, brown (10YR 4/3) moist; moderate medium prismatic structure parting to strong fine angular blocky; hard, friable, sticky and plastic; many fine and very fine roots; many very fine tubular pores; many distinct clay films on faces of peds; 5 percent pebbles; neutral; clear wavy boundary.

Bk1—16 to 27 inches; light brownish gray (10YR 6/2) loam, grayish brown (10YR 5/2) moist; weak medium prismatic structure parting to moderate fine and medium subangular blocky; hard, very friable, slightly sticky and slightly plastic; common fine and very fine roots; many very fine and few fine tubular pores; 5 percent pebbles; common fine seams and masses of lime and lime disseminated; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk2—27 to 34 inches; pale brown (10YR 6/3) loam, grayish brown (10YR 5/2) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots, many very fine and

few fine tubular pores; 5 percent pebbles; few fine seams and masses of lime and lime disseminated; violently effervescent; moderately alkaline; clear wavy boundary.

2Bk3—34 to 44 inches; pale brown (10YR 6/3) extremely gravelly loamy sand, grayish brown (10YR 5/2) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; many irregular pores; 50 percent pebbles, 20 percent cobbles; lime coats on lower surfaces of rock fragments; strongly effervescent; moderately alkaline; gradual wavy boundary.

2C—44 to 60 inches; pale brown (10YR 6/3) extremely gravelly sand, brown (10YR 4/3) moist; single grain; loose, nonsticky and nonplastic; 50 percent pebbles, and 20 percent cobbles; slightly effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 15 inches and may include all or part of the Bt horizon

Depth to the Bk horizon: 11 to 20 inches

Depth to the 2Bk horizon: 20 to 40 inches

A horizon

Hue: 10YR or 7.5YR

Value: 2 or 3 moist

Chroma: 2 or 3

Clay content: 15 to 25 percent

Rock fragments: 0 to 50 percent—0 to 3 percent stones, 0 to 5 percent cobbles, 0 to 15 percent pebbles

Reaction: pH 6.1 to 7.8

Bt horizons

Hue: 7.5YR, 10YR, or 2.5Y

Value: 4, 5, or 6 dry; 3, 4, or 5 moist

Chroma: 2 or 3

Texture: clay loam, sandy clay loam, loam

Clay content: 25 to 35 percent

Rock fragments: 0 to 30 percent—0 to 5 percent cobbles, 0 to 25 percent pebbles

Reaction: pH 6.6 to 8.4

Bk horizons

Hue: 7.5YR, 10YR, or 2.5Y

Value: 5, 6, 7, or 8 dry; 4, 5, 6, or 7 moist

Chroma: 2 or 3

Texture: loam, clay loam

Clay content: 20 to 35 percent

Rock fragments: 0 to 30 percent—0 to 5 percent cobbles, 0 to 25 percent pebbles

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.4 to 8.4

2Bk3 horizon

Hue: 2.5Y or 10YR
 Value: 5, 6, or 7 dry; 4, 5, or 6 moist
 Chroma: 2, 3, or 4
 Texture: loamy sand or sand
 Clay content: 0 to 5 percent
 Rock fragments: 35 to 80 percent—5 to 20 percent
 cobbles, 30 to 60 percent pebbles
 Calcium carbonate equivalent: 2 to 12 percent
 Reaction: pH 7.4 to 8.4

2C horizon

Hue: 2.5Y or 10YR
 Chroma: 2, 3, or 4
 Texture: loamy sand or sand
 Clay content: 0 to 5 percent
 Rock fragments: 35 to 80 percent—5 to 20 percent
 cobbles, 30 to 60 percent pebbles
 Reaction: pH 7.4 to 8.4

451C—Turner-Beaverton complex, 2 to 8 percent slopes

Setting

Landform:

- * Turner—Relict stream terraces
- * Beaverton—Relict stream terraces
- * Beaverton—Relict stream terraces

Position on landform:

- * Turner—Treads
- * Beaverton—Treads
- * Beaverton—Treads

Slope:

- * Turner—2 to 4 percent
- * Beaverton—2 to 8 percent
- * Beaverton—2 to 8 percent

Mean annual precipitation: 14 to 17 inches

Frost-free period: 100 to 120 days

Composition

Major Components

Turner and similar soils: 45 percent
 Beaverton and similar soils: 25 percent
 Beaverton and similar soils: 20 percent

Minor Components

Stony surface layers: 0 to 5 percent
 Slopes less than 2 percent: 0 to 3 percent
 Farnuf and similar soils: 0 to 2 percent

Major Component Description

Turner

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.1 inches

Beaverton

Surface layer texture: Very cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.9 inches

Beaverton

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Twilight Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Permeability: Moderately rapid (2.0 to 6.0 inches/hour)
Landform: Hills
Parent material: Residuum from sandstone
Slope range: 8 to 45 percent
Annual precipitation: 11 to 14 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 105 to 125 days

Taxonomic Class: Coarse-loamy, mixed, frigid Aridic Ustochrepts

Typical Pedon

Twilight fine sandy loam, in an area of Busby-Twilight fine sandy loams, 4 to 15 percent slopes, in rangeland, 2,200 feet west and 1,000 feet south of the northeast corner of sec. 12, T. 26 N., R. 6 E.

A—0 to 5 inches; grayish brown (10YR 5/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; moderate fine and very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; neutral; clear smooth boundary.

Bw—5 to 15 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and few fine tubular pores; neutral; clear wavy boundary.

C—15 to 30 inches; pale brown (10YR 6/3) fine sandy loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine and few fine tubular pores; mildly alkaline; clear wavy boundary.

Cr—30 to 60 inches; pale yellow (2.5Y 7/4) sandstone, light olive brown (2.5Y 5/6) moist.

Range in Characteristics

Content of clay in the control section: 5 to 18 percent

Depth to the Cr horizon: 20 to 40 inches

A horizon

Hue: 10YR or 2.5Y

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2 or 3

Clay content: 5 to 18 percent

Reaction: pH 6.6 to 7.8

Bw horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2, 3, or 4

Texture: fine sandy loam, sandy loam

Clay content: 5 to 18 percent

Reaction: pH 6.6 to 7.8

C horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2, 3, or 4

Texture: sandy loam, fine sandy loam

Clay content: 5 to 18 percent

Reaction: pH 7.4 to 8.4

661E—Twilight-Fleak complex, 8 to 25 percent slopes

Setting

Landform:

* Twilight—Hills

* Fleak—Hills

Position on landform:

* Twilight—Backslopes and footslopes

* Fleak—Backslopes and shoulders

Slope:

* Twilight—8 to 25 percent

* Fleak—8 to 25 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Twilight and similar soils: 50 percent

Fleak and similar soils: 35 percent

Minor Components

Busby and similar soils: 0 to 3 percent

Moderately deep, sandy soils: 0 to 3 percent

Slopes more than 25 percent: 0 to 3 percent

Yetull and similar soils: 0 to 2 percent

Yamacall and similar soils: 0 to 2 percent

Areas of rock outcrop: 0 to 2 percent

Major Component Description

Twilight

Surface layer texture: Fine sandy loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Sandstone residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.2 inches

Fleak

Surface layer texture: Loamy fine sand

Depth class: Shallow (10 to 20 inches)

Drainage class: Excessively drained

Dominant parent material: Sandstone residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 1.2 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Vanda Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Very slow (<0.06 inch/hour)

Landform: Alluvial fans, stream terraces

Parent material: Alluvium

Slope range: 0 to 8 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Fine, montmorillonitic (calcareous), frigid Aridic Ustorthents

Typical Pedon

Vanda clay, in an area of Marvan-Vanda clays, 2 to 8 percent slopes, in rangeland, 1,700 feet north and 1,100 feet west of the southeast corner of sec. 7, T. 27 N., R. 8 E.

E—0 to 1 inch; light brownish gray (2.5Y 6/2) clay loam, grayish brown (2.5Y 5/2) moist; vesicular crust; hard, friable, sticky and plastic; common fine and very fine roots; common very fine vesicular pores; mildly alkaline; abrupt smooth boundary.

Bw—1 to 5 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; moderate fine angular blocky structure; extremely hard, firm, very sticky and very plastic; common very fine and fine roots; common very fine tubular pores; slightly effervescent; strongly alkaline; clear wavy boundary.

By—5 to 12 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure parting to weak fine subangular blocky; extremely hard, firm, very sticky and very plastic; common very fine and fine roots; common very fine tubular pores; few fine seams of gypsum; slightly effervescent; strongly alkaline; clear wavy boundary.

Bnyz1—12 to 31 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; massive; very hard, firm, very sticky and very plastic; few fine and very fine roots; few very fine tubular pores;

common fine and medium masses and seams of gypsum and other salts; slightly effervescent; moderately alkaline; gradual wavy boundary.

Bnyz2—31 to 60 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; massive; extremely hard, firm, very sticky and very plastic; few very fine tubular pores; common fine masses and seams of gypsum and other salts; slightly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 35 to 60 percent

Depth to the Bnyz horizon: 7 to 24 inches

E and Bw horizons

Hue: 2.5Y or 5Y

Value: 5, 6, or 7 dry; 4 or 5 moist

Chroma: 1, 2, or 3

Clay content: 40 to 60 percent

Electrical conductivity: 2 to 8 mmhos/cm

Sodium adsorption ratio: 5 to 30

Reaction: pH 7.9 to 9.6

By horizon

Hue: 2.5Y or 5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 or 3

Texture: clay, silty clay, silty clay loam

Clay content: 35 to 60 percent

Electrical conductivity: 8 to 16 mmhos/cm

Sodium adsorption ratio: 13 to 30

Reaction: pH 7.9 to 9.6

Bnyz horizons

Hue: 2.5Y or 5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 or 3

Texture: clay, silty clay, silty clay loam

Clay content: 35 to 60 percent

Gypsum content: 1 to 5 percent with total gypsum less than 150

Electrical conductivity: 8 to 16 mmhos/cm

Sodium adsorption ratio: 13 to 30

Gypsum content: 1 to 5 percent

Reaction: pH 7.9 to 9.6

48A—Vanda clay, 0 to 2 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Slope: 0 to 2 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Vanda and similar soils: 85 percent

Minor Components

Marvan and similar soils: 0 to 10 percent

Stratified, loamy soils: 0 to 5 percent

Major Component Description

Surface layer texture: Clay

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Salt affected: Saline within 30 inches

Sodium affected: Sodic within 30 inches

Available water capacity: Mainly 6.0 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

48C—Vanda clay, 2 to 8 percent slopes

Setting

Landform: Alluvial fans

Slope: 2 to 8 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Vanda and similar soils: 85 percent

Minor Components

Marvan and similar soils: 0 to 10 percent

Stratified, loamy soils: 0 to 5 percent

Major Component Description

Surface layer texture: Clay

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Salt affected: Saline within 30 inches

Sodium affected: Sodic within 30 inches

Available water capacity: Mainly 6.0 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Vebar Series

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Permeability: Moderately rapid (2.0 to 6.0 inches/hour)

Landform: Hills

Parent material: Residuum from sandstone

Slope range: 8 to 25 percent

Annual precipitation: 14 to 17 inches

Annual air temperature: 41 to 45 degrees F

Frost-free period: 100 to 120 days

Taxonomic Class: Coarse-loamy, mixed Typic Haploborolls

Typical Pedon

Vebar fine sandy loam, in an area of Tally-Vebar fine sandy loams, 8 to 25 percent slopes, in rangeland, 1,150 feet south and 500 feet east of the northwest corner of sec. 10, T. 20 N., R. 11 E.

A—0 to 7 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, nonsticky and slightly plastic; many fine roots; neutral; clear smooth boundary.

Bw1—7 to 12 inches; brown (10YR 4/3) fine sandy loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; many fine roots; many fine and very fine tubular pores; neutral; clear wavy boundary.

Bw2—12 to 17 inches; brown (10YR 5/3) fine sandy loam, brown (10YR 4/3) moist; moderate medium prismatic structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine roots; many very fine tubular pores; neutral; clear wavy boundary.

BcK—17 to 31 inches; pale yellow (2.5Y 7/4) fine sandy loam, light yellowish brown (2.5Y 6/4) moist; massive; slightly hard, very friable, slightly sticky

and slightly plastic; common fine and very fine roots; many very fine tubular pores; common fine masses of lime and lime disseminated; violently effervescent; moderately alkaline; gradual wavy boundary.

Cr—31 to 60 inches; pale yellow (2.5Y 7/4) sandstone, light yellowish brown (2.5Y 6/4) moist; strongly effervescent in the upper part and slightly effervescent in the lower part; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 16 inches

Content of clay in the control section: 10 to 18 percent

Depth to the Bk horizon: 12 to 26 inches

Depth to the Cr horizon: 20 to 40 inches

A horizon

Value: 3, 4, or 5 dry; 2 or 3 moist

Chroma: 2 or 3

Clay content: 10 to 18 percent

Reaction: pH 6.1 to 7.8

Bw horizons

Hue: 10YR or 2.5Y

Value: 4, 5, or 6 dry; 3 or 4 moist

Chroma: 2, 3, or 4

Texture: fine sandy loam, sandy loam, loam

Clay content: 10 to 18 percent

Reaction: pH 6.1 to 8.4

BCk horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 2, 3, or 4

Texture: fine sandy loam, sandy loam, loamy fine sand

Clay content: 10 to 18 percent

Reaction: pH 7.4 to 8.4

Vida Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Slow (0.06 to 0.2 inch/hour)

Landform: Till plains, hills

Parent material: Glacial till

Slope range: 0 to 15 percent

Annual precipitation: 14 to 17 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 100 to 120 days

Taxonomic Class: Fine-loamy, mixed Typic Argiborolls

Typical Pedon

Vida clay loam, in an area of Bearpaw-Vida clay loams, 4 to 8 percent slopes, in cropland, 500 feet east and 300 feet north of the southwest corner of sec. 15, T. 22 N., R. 8 E.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; strong fine granular structure; slightly hard, very friable, sticky and plastic; common fine roots; few cobbles, 5 percent pebbles; neutral; abrupt smooth boundary.

Bt—5 to 8 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; strong medium prismatic structure parting to moderate fine subangular blocky; very hard, firm, sticky and plastic; common fine roots; many very fine tubular pores; many faint clay films on faces of peds; few pebbles; neutral; clear wavy boundary.

Bk1—8 to 15 inches; pale brown (10YR 6/3) clay loam, dark brown (10YR 4/3) moist; weak medium prismatic structure parting to moderate fine and medium subangular blocky; hard, friable, sticky and plastic; few fine roots; many very fine and few fine tubular pores; few pebbles; lime disseminated and few fine masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bk2—15 to 38 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; very hard, friable, sticky and plastic; few fine roots; many very fine tubular pores; few pebbles; common fine and medium masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

BCy—38 to 60 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; massive; very hard, firm, sticky and plastic; common very fine tubular pores; 5 percent pebbles; common medium masses of gypsum decreasing with depth; slightly effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 10 inches (may include Bt horizon)

Content of clay in the control section: 25 to 35 percent

Depth to the Bk horizon: 6 to 10 inches

Ap horizon

Value: 3 or 4 dry, 2 or 3 moist
 Chroma: 2 or 3
 Texture: loam, clay loam
 Clay content: 20 to 30 percent
 Rock fragments: 0 to 15 percent—0 to 5 percent
 cobbles and stones, 0 to 10 percent pebbles
 Reaction: pH 6.6 to 7.8

Bt horizon

Hue: 10YR
 Value: 4 or 5 dry, 3 or 4 moist
 Chroma: 2 or 3
 Texture: loam, clay loam
 Clay content: 25 to 35 percent
 Rock fragments: 0 to 15 percent—0 to 5 percent
 cobbles, 0 to 10 percent pebbles
 Reaction: pH 6.6 to 7.8

Bk1 horizon

Hue: 10YR or 2.5Y
 Value: 6 or 7 dry, 5 or 6 moist
 Chroma: 2, 3, or 4
 Texture: loam, clay loam
 Clay content: 25 to 35 percent
 Rock fragments: 0 to 15 percent—0 to 5 percent
 cobbles, 0 to 10 percent pebbles
 Calcium carbonate equivalent: 5 to 15 percent
 Reaction: pH 7.4 to 8.4

Bk2 and BCy horizon

Hue: 10YR or 2.5Y
 Value: 6 or 7 dry; 4, 5, or 6 moist
 Chroma: 2, 3, or 4
 Texture: loam, clay loam
 Clay content: 25 to 35 percent
 Rock fragments: 0 to 15 percent—0 to 5 percent
 cobbles, 0 to 10 percent pebbles
 Calcium carbonate equivalent: 2 to 12 percent
 Gypsum content: 0 to 5 percent
 Reaction: pH 7.9 to 8.4

692D—Vida-Bearpaw clay loams, 4 to 15 percent slopes

Setting

Landform:

- * Vida—Hills
- * Bearpaw—Hills

Position on landform:

- * Vida—Backslopes and shoulders
- * Bearpaw—Footslopes

Slope:

- * Vida—4 to 15 percent
- * Bearpaw—4 to 15 percent

Mean annual precipitation: 14 to 17 inches

Frost-free period: 100 to 120 days

Composition

Major Components

Vida and similar soils: 55 percent
 Bearpaw and similar soils: 30 percent

Minor Components

Zahill and similar soils: 0 to 10 percent
 Very gravelly surface layers: 0 to 5 percent

Major Component Description

Vida

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.6 inches

Bearpaw

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.1 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

693C—Vida-Bearpaw-Nishon clay loams, 0 to 15 percent slopes

Setting

Landform:

- * Vida—Hills
- * Bearpaw—Hills
- * Nishon—Closed depressions

Position on landform:

- * Vida—Backslopes and shoulders
- * Bearpaw—Backslopes and footslopes
- * Nishon—Toeslopes

Slope:

- * Vida—4 to 15 percent
- * Bearpaw—2 to 8 percent
- * Nishon—0 to 1 percent

Mean annual precipitation: 14 to 17 inches*Frost-free period:* 100 to 120 days**Composition****Major Components**

Vida and similar soils: 40 percent
 Bearpaw and similar soils: 25 percent
 Nishon and similar soils: 20 percent

Minor Components

Zahill and similar soils: 0 to 10 percent
 Waltham and similar soils: 0 to 2 percent
 Acel and similar soils: 0 to 2 percent
 Stratified loam to sand soils: 0 to 1 percent

Major Component Description**Vida**

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.6 inches

Bearpaw

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.1 inches

Nishon

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Poorly drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Ponding: Long
Available water capacity: Mainly 9.3 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

691D—Vida-Williams loams, 8 to 15 percent slopes**Setting***Landform:*

- * Vida—Hills
- * Williams—Hills

Position on landform:

- * Vida—Backslopes and shoulders
- * Williams—Footslopes

Slope:

- * Vida—8 to 15 percent
- * Williams—8 to 15 percent

Mean annual precipitation: 14 to 17 inches*Frost-free period:* 100 to 120 days**Composition****Major Components**

Vida and similar soils: 55 percent
 Williams and similar soils: 30 percent

Minor Components

Zahill and similar soils: 0 to 7 percent
 Slopes less than 8 percent: 0 to 6 percent
 Nishon and similar soils: 0 to 2 percent

Major Component Description**Vida**

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.7 inches

Williams

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 10.5 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

69C—Vida-Zahill clay loams, 2 to 8 percent slopes

Setting

Landform:

* Vida—Till plains

* Zahill—Till plains

Position on landform:

* Vida—Backslopes and footslopes

* Zahill—Backslopes and shoulders

Slope:

* Vida—2 to 8 percent

* Zahill—2 to 8 percent

Mean annual precipitation: 14 to 17 inches

Frost-free period: 100 to 120 days

Composition

Major Components

Vida and similar soils: 50 percent

Zahill and similar soils: 35 percent

Minor Components

Bearpaw and similar soils: 0 to 10 percent

Williams and similar soils: 0 to 2 percent

Very gravelly surface layers: 0 to 2 percent

Very gravelly sandy loam soils: 0 to 1 percent

Major Component Description

Vida

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Till

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.6 inches

Zahill

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Till

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.6 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Waltham Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Very slow (<0.06 inch/hour)

Landform: Till plains

Parent material: Glacial till

Slope range: 0 to 4 percent

Annual precipitation: 14 to 17 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 100 to 120 days

Taxonomic Class: Fine, montmorillonitic Typic Natriboralfs

Typical Pedon

Waltham clay loam, in an area of Bearpaw-Waltham clay loams, 0 to 4 percent slopes, in rangeland, 500 feet south and 1,000 feet east of the northwest corner of sec. 28, T. 22 N., R. 9 E.

E—0 to 2 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; strong medium platy structure; hard, very friable, sticky and slightly plastic; common fine and very fine roots; few very fine tubular pores; neutral; abrupt smooth boundary.

Bt1—2 to 6 inches; dark grayish brown (2.5Y 4/2) clay, very dark grayish brown (2.5Y 3/2) moist; strong medium columnar structure parting to strong medium subangular blocky; extremely hard, very firm, very sticky and very plastic; common fine and very fine roots; few very fine tubular pores; many distinct clay films on faces of peds; mildly alkaline; clear smooth boundary.

Bt2—6 to 11 inches; dark grayish brown (2.5Y 4/2) clay, dark grayish brown (2.5Y 4/2) moist; strong medium prismatic structure parting to strong fine and medium subangular blocky; extremely hard,

very firm, very sticky and very plastic; common fine and very fine roots; common very fine tubular pores; many distinct clay films on faces of peds; mildly alkaline; clear wavy boundary.

Btkn—11 to 18 inches; pale brown (10YR 6/3) clay loam, brown (10YR 4/3) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; very hard, firm, very sticky and very plastic; common fine and very fine roots; common very fine tubular pores; few distinct clay films on faces of peds; few fine masses of lime; strongly effervescent; strongly alkaline; clear wavy boundary.

Bkny1—18 to 30 inches; brown (10YR 5/3) clay loam, brown (10YR 4/3) moist; weak coarse prismatic structure parting to moderate fine and medium subangular blocky; hard, friable, sticky and plastic; few very fine roots; common very fine tubular pores; common fine masses of lime; common fine masses of gypsum; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bkny2—30 to 44 inches; light yellowish brown (2.5Y 6/4) clay loam, dark grayish brown (2.5Y 4/2) moist; weak fine and medium subangular blocky structure; hard, friable, sticky and plastic; common very fine tubular pores; few fine masses of lime; few fine masses of gypsum; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bnyz—44 to 60 inches; light yellowish brown 2.5Y 6/4) clay loam, dark grayish brown (2.5Y 4/2) moist; weak fine and medium subangular blocky structure; hard, friable, sticky and plastic; common very fine tubular pores; few fine masses of gypsum and other salts; disseminated lime; strongly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 45 to 60 percent

Depth to the Btkn horizon: 10 to 16 inches

E horizon

Hue: 2.5Y or 10YR

Value: 6 or 7 dry, 4 or 5 moist

Chroma: 2 or 3

Clay content: 20 to 27 percent

Rock fragments: 0 to 5 percent pebbles

Electrical conductivity: 0 to 2 mmhos/cm

Sodium adsorption ratio: 0 to 13

Reaction: pH 6.6 to 8.4

An A horizon 1 or 2 inches thick, with granular structure above the E horizon is allowed

Bt horizons

Hue: 2.5Y or 10YR

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2 or 3

Clay content: 45 to 60 percent

Rock fragments: 0 to 5 percent pebbles

Electrical conductivity: 0 to 2 mmhos/cm

Sodium adsorption ratio: 4 to 13

Reaction: pH 7.4 to 8.4

Btkn horizon

Hue: 2.5Y or 10YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2, 3, or 4

Texture: clay loam, clay

Clay content: 35 to 45 percent

Rock fragments: 0 to 5 percent mainly pebbles

Electrical conductivity: 0 to 4 mmhos/cm

Sodium adsorption ratio: 13 to 25

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.9 to 9.0

Bkny horizons

Hue: 2.5Y or 10YR

Value: 5, 6, or 7 dry; 4 or 5 moist

Chroma: 2, 3, or 4

Clay content: 27 to 40 percent

Rock fragments: 0 to 5 percent pebbles

Electrical conductivity: 4 to 16 mmhos/cm

Sodium adsorption ratio: 4 to 20

Gypsum content: 3 to 5 percent

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.4 to 9.0

Bnyz horizon

Hue: 2.5Y or 10YR

Value: 5, 6, or 7 dry; 4 or 5 moist

Chroma: 2, 3, or 4

Clay content: 27 to 40 percent

Rock fragments: 0 to 5 percent pebbles

Electrical conductivity: 4 to 16 mmhos/cm

Sodium adsorption ratio: 4 to 20

Gypsum content: 3 to 5 percent

Calcium carbonate equivalent: 5 to 12 percent

Reaction: pH 7.4 to 9.0

Warwood Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Mountains

Parent material: Colluvium or residuum from igneous rocks

Slope range: 15 to 45 percent
Annual precipitation: 20 to 28 inches
Annual air temperature: 38 to 42 degrees F
Frost-free period: 50 to 70 days

Taxonomic Class: Fine-loamy, mixed Glossic Cryoboralfs

Typical Pedon

Warwood loam, 15 to 45 percent slopes, in forest, 1,300 feet east and 1,700 feet north of the southwest corner of sec. 7, T. 20 N., R. 9 E.

Oi—2 inches to 0; forest litter of slightly decomposed needles, twigs, and leaves.

A—0 to 4 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; strong fine granular structure; soft, very friable, slightly sticky and slightly plastic; many fine and very fine and common medium and coarse roots; 10 percent pebbles; medium acid; abrupt wavy boundary.

E—4 to 8 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure parting to strong medium granular; hard, very friable, slightly sticky and slightly plastic; many fine and very fine and common medium and coarse roots; many very fine tubular pores; 10 percent pebbles; medium acid; clear wavy boundary.

Bt/E—8 to 15 inches; Bt part (60 percent) is brown (10YR 5/3) sandy clay loam, dark brown (10YR 4/3) moist; E part (40 percent) is light brownish gray (10YR 6/2) sandy loam, dark grayish brown (10YR 4/2) moist tonguing into the Bt part; strong fine and medium subangular blocky structure; very hard, friable, sticky and plastic; common fine and very fine and few medium and coarse roots; many very fine tubular pores; common distinct clay films on faces of peds of the Bt part; 5 percent pebbles; medium acid; gradual wavy boundary.

Bt1—15 to 24 inches; brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; strong fine and medium subangular blocky structure; very hard, friable, sticky and plastic; common fine and very fine roots; many very fine tubular pores; common faint clay films on faces of peds; 5 percent pebbles; medium acid; clear wavy boundary.

Bt2—24 to 38 inches; pale brown (10YR 6/3) clay loam, dark grayish brown (10YR 4/2) moist; strong fine and medium subangular blocky structure; very hard, friable, sticky and plastic;

common fine and very fine roots; many very fine tubular pores; common faint clay films on faces of peds; 5 percent pebbles; medium acid; clear wavy boundary.

BC—38 to 60 inches; grayish brown (10YR 5/2) sandy clay loam, dark grayish brown (10YR 4/2) moist; moderate fine and medium subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; few fine and very fine roots; many very fine tubular pores; 10 percent pebbles; few fine seams of lime below 50 inches; neutral.

Range in Characteristics

Content of clay in the control section: 27 to 35 percent

Rock fragments in the control section: 5 to 25 percent

Depth to the Bt horizon: 12 to 24 inches

A horizon

Value: 4 or 5 dry, 2 or 3 moist

Clay content: 20 to 27 percent

Rock fragments: 5 to 15 percent—5 to 10 percent pebbles, 0 to 5 percent cobbles

Reaction: pH 5.6 to 6.5

Some pedons do not have an A horizon

E horizon

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 or 3

Texture: loam, sandy loam

Clay content: 15 to 27 percent

Rock fragments: 5 to 15 percent—5 to 15 percent pebbles, 0 to 5 percent cobbles

Reaction: pH 5.6 to 6.5

Bt/E horizon

Value: Bt part 4 or 5, E part 5 or 6 dry; Bt part 3 or 4 moist, E part 4 moist

Chroma: 2 or 3

Texture: sandy clay loam, clay loam (mixed)

Clay content: 20 to 35 percent

Rock fragments: 5 to 15 percent—5 to 15 percent pebbles, 0 to 5 percent cobbles

Reaction: pH 5.6 to 6.5

Bt1 horizon

Value: 5 or 6 dry, 3 or 4 moist

Chroma: 2 or 3

Clay content: 27 to 35 percent

Rock fragments: 5 to 25 percent—5 to 20 percent pebbles, 0 to 5 percent cobbles

Reaction: pH 6.1 to 7.3

Bt2 and BC horizons

Value: 5 or 6 dry, 3 or 4 moist

Chroma: 2 or 3

Texture: clay loam, sandy clay loam
 Clay content: 20 to 35 percent
 Rock fragments: 5 to 25 percent—5 to 20 percent
 pebbles, 0 to 5 percent cobbles
 Reaction: pH 6.1 to 7.3

530F—Warwood loam, 15 to 45 percent slopes

Setting

Landform: Mountains
Slope: 15 to 45 percent
Mean annual precipitation: 20 to 28 inches
Frost-free period: 50 to 70 days

Composition

Major Components

Warwood and similar soils: 85 percent

Minor Components

Ambrant and similar soils: 0 to 5 percent
 Moderately deep, loamy soils: 0 to 5 percent
 Very gravelly clay loam soils: 0 to 3 percent
 Soils with a clay subsoil: 0 to 2 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Colluvium or residuum
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 9.5 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

W—Water

Composition

Major Components

Water: 100 percent

Major Component Description

Definition: Areas of open water

Wayden Series

Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Hills, escarpments
Parent material: Residuum from shale
Slope range: 8 to 70 percent
Annual precipitation: 14 to 17 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 100 to 120 days

Taxonomic Class: Clayey, montmorillonitic
 (calcareous), frigid, shallow Typic Ustorthents

Typical Pedon

Wayden silty clay loam, in an area of Wayden-Sagedale silty clay loams, 25 to 60 percent slopes, in rangeland, 1,400 feet east and 900 feet north of the southwest corner of sec. 20, T. 21 N., R. 12 E.

A—0 to 3 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; moderate fine granular structure; slightly hard, friable, sticky and plastic; many fine and common medium roots; strongly effervescent; moderately alkaline; clear smooth boundary.

Bky—3 to 12 inches; grayish brown (2.5Y 5/2) silty clay loam, olive brown (2.5Y 4/3) moist; weak medium subangular blocky structure; hard, friable, sticky and very plastic; common fine and very fine roots; common very fine tubular pores; common fine seams of lime and gypsum; violently effervescent; moderately alkaline; clear wavy boundary.

BCy—12 to 18 inches; light brownish gray (2.5Y 6/2) silty clay loam, light olive brown (2.5Y 5/4) moist; platy rock structure; hard, friable, very sticky and very plastic; common fine and very fine roots; 70 percent soft shale chips; many fine and medium masses of gypsum; violently effervescent; mildly alkaline; clear smooth boundary.

Cr—18 to 60 inches; light brownish gray and light yellowish brown (2.5Y 6/2 and 6/4) shale, light olive brown 2.5Y, 5/4) moist; slightly effervescent; mildly alkaline.

Range in Characteristics

Content of clay in the control section: 35 to 50 percent
Depth to the Cr horizon: 10 to 20 inches

A horizon

Hue: 2.5Y or 5Y

Value: 5, 6, or 7 dry; 3, 4, or 5 moist

Chroma: 2 or 3
 Clay content: 35 to 40 percent
 Reaction: pH 7.4 to 8.4

Bky and BCy horizons

Hue: 2.5Y or 5Y
 Value: 5, 6, 7, or 8 dry; 4, 5, or 6 moist
 Chroma: 1, 2, 3, or 4
 Texture: silty clay loam, clay loam, silty clay
 Clay content: 35 to 50 percent
 Reaction: pH 7.4 to 8.4

**621F—Wayden-Sagedale silty clay loams,
 25 to 60 percent slopes**

Setting

Landform:

- * Wayden—Hills
- * Sagedale—Hills

Position on landform:

- * Wayden—Backslopes and shoulders
- * Sagedale—Footslopes

Slope:

- * Wayden—25 to 60 percent
- * Sagedale—25 to 45 percent

Mean annual precipitation: 14 to 17 inches

Frost-free period: 100 to 120 days

Composition

Major Components

Wayden and similar soils: 50 percent
 Sagedale and similar soils: 35 percent

Minor Components

Macar and similar soils: 0 to 5 percent
 Cabba and similar soils: 0 to 5 percent
 Areas of rock outcrop: 0 to 3 percent
 Stony surface layers: 0 to 1 percent
 Bouldery surface layers: 0 to 1 percent

Major Component Description

Wayden

Surface layer texture: Silty clay loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.9 inches

Sagedale

Surface layer texture: Silty clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.4 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Weingart Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Permeability: Very slow (<0.06 inch/hour)
Landform: Sedimentary plains
Parent material: Residuum from interbedded shale and sandstone
Slope range: 0 to 2 percent
Annual precipitation: 11 to 14 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 105 to 125 days

Taxonomic Class: Fine, montmorillonitic Typic Natriboralfs

Typical Pedon

Weingart clay loam, in an area of Mego-not-Weingart-Delpoint complex, 0 to 4 percent slopes, in rangeland, 1,450 feet west and 50 feet north of the southeast corner of sec. 20, T. 25 N., R. 16 E.

E—0 to 3 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; moderate thin platy structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and very fine roots; common very fine tubular pores; neutral; abrupt smooth boundary.

Btn—3 to 10 inches; brown (10YR 5/3) clay, brown (10YR 4/3) moist; strong medium columnar structure parting to strong fine and medium subangular blocky; very hard, firm, sticky and very plastic; common fine and very fine roots; few very fine tubular pores; many faint clay films on faces of peds; mildly alkaline; clear wavy boundary.

Bkn—10 to 17 inches; light brownish gray (10YR 6/2) clay loam, dark grayish brown (10YR 4/2) moist; weak medium prismatic structure parting to moderate fine and medium subangular blocky; very hard, friable, sticky and plastic; few very fine roots; common very fine tubular pores; common fine masses of lime; violently effervescent; strongly alkaline; clear wavy boundary.

Bknyz—17 to 28 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; moderate fine and medium subangular blocky structure; very hard, friable, sticky and plastic; few very fine roots; many very fine tubular pores; common fine masses of lime; few fine masses of gypsum and other salts; violently effervescent; strongly alkaline; gradual wavy boundary.

Cr—28 to 60 inches; light gray and light brownish gray (5Y 6/1 and 2.5Y 6/2) interbedded shale and sandstone, dark gray (5Y 4/1) moist; common fine masses of lime, gypsum, and other salts in the upper part; slightly effervescent; strongly alkaline.

Range in Characteristics

Content of clay in the control section: 40 to 60 percent

Depth to the Bk horizon: 8 to 14 inches

Depth to the Bkyz horizon: 12 to 24 inches

Depth to the Cr horizon: 20 to 40 inches

E horizon

Hue: 10YR or 2.5Y

Value: 5, 6, or 7 dry; 3, 4, 5, or 6 moist

Chroma: 2 or 3

Clay content: 20 to 27 percent

Rock fragments: 0 to 10 percent—0 to 10 percent stones and cobbles, 0 to 5 percent hard shale, 0 to 5 percent soft shale

Reaction: pH 5.6 to 7.8

Btn horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2, 3, or 4

Texture: clay, silty clay, sandy clay

Clay content: 40 to 60 percent

Rock fragments: 0 to 10 percent—0 to 5 percent hard shale, 0 to 5 percent soft shale

Electrical conductivity: 0 to 8 mmhos/cm

Sodium adsorption ratio: 10 to 30

Reaction: pH 7.4 to 9.6

When the SAR is less than 13, there is more

exchangeable magnesium plus sodium than calcium plus exchange acidity

Bkn horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5, 6, or 7 dry; 4 or 5 moist

Chroma: 2 or 3

Texture: clay loam, silty clay, clay, sandy clay, silty clay loam

Clay content: 35 to 55 percent

Rock fragments: 0 to 10 percent—0 to 5 percent

hard shale, 0 to 5 percent soft shale

Electrical conductivity: 4 to 16 mmhos/cm

Sodium adsorption ratio: 13 to 30

Lime: few to common masses

Gypsum content: none to common seams, 0 to 2 percent

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.9 to 9.6

Bknyz horizon

Hue: 2.5Y or 5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 1, 2, 3, or 4

Texture: clay, silty clay, clay loam, silty clay loam

Clay content: 35 to 55 percent

Rock fragments: 0 to 10 percent—0 to 5 percent

hard shale, 0 to 5 percent soft shale

Electrical conductivity: 4 to 16 mmhos/cm

Sodium adsorption ratio: 13 to 30

Gypsum content: 1 to 5 percent

Calcium carbonate equivalent: 2 to 12 percent

Reaction: pH 7.9 to 9.6

Cr horizon

Material: interbedded shale and sandstone

Reaction: greater than 7.8

Whitlash Series

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Mountains, hills

Parent material: Residuum from igneous rocks

Slope range: 8 to 70 percent

Annual precipitation: 15 to 22 inches

Annual air temperature: 41 to 44 degrees F

Frost-free period: 90 to 110 days

Taxonomic Class: Loamy-skeletal, mixed Lithic Haploborolls

Typical Pedon

Whitlash very cobbly loam, in an area of Perma-Whitlash complex, 25 to 70 percent slopes, in rangeland, 1,500 feet north and 1,000 feet east of the southwest corner of sec. 5, T. 28 N., R. 15 E.

A—0 to 6 inches; dark grayish brown (10YR 4/2) very cobbly loam, very dark brown (10YR 2/2) moist; strong fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; 15 percent cobbles, 20 percent pebbles; slightly acid; clear wavy boundary.

Bw—6 to 15 inches; grayish brown (10YR 5/2) extremely cobbly loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine and few medium roots; many very fine and fine irregular pores; 40 percent cobbles, 20 percent pebbles; neutral.

R—15 inches; hard fractured igneous bedrock.

Range in Characteristics

Mollic epipedon thickness: 7 to 20 inches

Content of clay in the control section: 10 to 27 percent

Rock fragments in the control section: 35 to 75 percent

Depth to bedrock: 10 to 20 inches

A horizon

Value: 3 or 4 dry, 2 or 3 moist

Chroma: 1, 2, or 3

Clay content: 10 to 27 percent and less than 35 percent fine and coarser sand

Rock fragments: 15 to 60 percent—15 to 35 percent pebbles or channers, 0 to 30 percent cobbles, flagstones, or stones

Rock fragments, surface cover: 0.01 to 3 percent stones

Reaction: pH 6.1 to 7.3

Bw horizon

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2 or 3

Texture: loam, sandy clay loam, or sandy loam
Clay content: 10 to 27 percent and less than 35 percent fine and coarser sand

Rock fragments: 35 to 80 percent—15 to 60 percent pebbles or channers, 5 to 50 percent cobbles, flagstones, or stones

Reaction: pH 6.1 to 7.3

Some pedons have a C horizon

892F—Whitlash-Belain-Rock outcrop complex, 25 to 60 percent slopes

Setting

Landform:

* Whitlash—Hills

* Belain—Hills

* Rock outcrop—Hills

Position on landform:

* Whitlash—Backslopes and shoulders

* Belain—Backslopes and footslopes

* Rock outcrop—Shoulders and summits

Slope:

* Whitlash—25 to 60 percent

* Belain—25 to 45 percent

Mean annual precipitation: 15 to 19 inches

Frost-free period: 90 to 110 days

Composition

Major Components

Whitlash and similar soils: 35 percent

Belain and similar soils: 30 percent

Rock outcrop: 20 percent

Minor Components

Hedoes and similar soils: 0 to 5 percent

Perma and similar soils: 0 to 5 percent

Soils with ponderosa pine: 0 to 5 percent

Major Component Description

Whitlash

Surface layer texture: Very cobbly loam

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Dominant parent material: Igneous residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 1.2 inches

Belain

Surface layer texture: Loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Igneous residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 3.7 inches

Rock outcrop

Definition: Exposures of igneous bedrock

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Williams Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Slow (0.06 to 0.2 inch/hour)

Landform: Till plains, hills

Parent material: Glacial till

Slope range: 0 to 15 percent

Annual precipitation: 14 to 17 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 100 to 120 days

Taxonomic Class: Fine-loamy, mixed Typic Argiborolls

Typical Pedon

Williams loam, in an area of Vida-Williams loams, 8 to 15 percent slopes, in rangeland, 2,300 feet east and 2,200 feet south of the northwest corner of sec. 22, T. 23 N., R. 9 E.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; strong granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; neutral; abrupt smooth boundary.

Bt1—5 to 9 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; strong medium prismatic structure parting to strong fine and medium subangular blocky; hard, friable, sticky and plastic; many very fine and fine roots; many very fine tubular pores; common faint clay films on faces of peds; mildly alkaline; clear wavy boundary.

Bt2—9 to 16 inches; grayish brown (10YR 5/2) clay loam, brown (10YR 4/3) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; hard, friable, sticky and plastic; common very fine and fine roots; many very fine tubular pores; common faint clay films on faces of peds; mildly alkaline; clear wavy boundary.

Bk1—16 to 32 inches; pale brown (10YR 6/3) clay loam, grayish brown (10YR 5/2) moist; weak medium prismatic structure parting to weak medium subangular blocky; hard, friable, sticky and plastic; few very fine and fine roots; many very fine tubular pores; many fine and medium masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk2—32 to 60 inches; light yellowish brown (2.5Y 6/4) clay loam, olive brown (2.5Y 4/4) moist; weak medium subangular blocky structure; friable, sticky and plastic; few very fine roots; common very fine and tubular pores; 5 percent pebbles; few fine masses of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 7 to 15 inches and may include all or part of the Bt horizons

Content of clay in the control section: 25 to 35 percent

Depth to the Bk horizon: 10 to 25 inches

A horizon

Hue: 10YR

Value: 3, 4, or 5 dry; 2 or 3 moist

Chroma: 2 (some pedons in native grassland have a moist chroma of less than 1.5 in the upper 1 to 3 inches)

Clay content: 15 to 27 percent

Reaction: pH 6.6 to 7.3

Bt horizons

Hue: 10YR or 2.5Y

Value: 4, 5, or 6 dry; 2, 3, 4, or 5 moist

Chroma: 2, 3, or 4

Texture: loam or clay loam

Clay content: 25 to 35 percent

Structure: strong or moderate, medium or

coarse prismatic that parts to strong or moderate, medium, or fine angular, or subangular blocky

Reaction: pH 6.6 to 7.8

Bk horizons

Hue: 10YR, 2.5Y, or 5Y

Value: 4, 5, 6, 7, or 8 dry; 3, 4, 5, or 6 moist

Chroma: 2 to 4

Texture: loam or clay loam

Clay content: 22 to 35 percent

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.4 to 8.4

Some pedons have a BC or Bck horizon

801B—Williams-Vida loams, 0 to 4 percent slopes**Setting***Landform:*

- * Williams—Till plains
- * Vida—Till plains

Position on landform:

- * Williams—Foothills and toeslopes
- * Vida—Backslopes and shoulders

Slope:

- * Williams—0 to 4 percent
- * Vida—0 to 4 percent

Mean annual precipitation: 14 to 17 inches*Frost-free period:* 100 to 120 days**Composition****Major Components**

Williams and similar soils: 50 percent
 Vida and similar soils: 35 percent

Minor Components

Zahill and similar soils: 0 to 9 percent
 Tally and similar soils: 0 to 5 percent
 Nishon and similar soils: 0 to 1 percent

Major Component Description**Williams***Surface layer texture:* Loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Till*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 10.5 inches**Vida***Surface layer texture:* Loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Till*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 9.7 inches**Management**

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

801C—Williams-Vida loams, 4 to 8 percent slopes**Setting***Landform:*

- * Williams—Till plains
- * Vida—Till plains

Position on landform:

- * Williams—Foothills and toeslopes
- * Vida—Backslopes and shoulders

Slope:

- * Williams—4 to 8 percent
- * Vida—4 to 8 percent

Mean annual precipitation: 14 to 17 inches*Frost-free period:* 100 to 120 days**Composition****Major Components**

Williams and similar soils: 50 percent
 Vida and similar soils: 35 percent

Minor Components

Zahill and similar soils: 0 to 9 percent
 Tally and similar soils: 0 to 5 percent
 Nishon and similar soils: 0 to 1 percent

Major Component Description**Williams***Surface layer texture:* Loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Till*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 10.5 inches**Vida***Surface layer texture:* Loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Till*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 9.7 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Winifred Series

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Permeability: Slow (0.06 to 0.2 inch/hour)

Landform: Hills

Parent material: Residuum from shale

Slope range: 15 to 45 percent

Annual precipitation: 17 to 19 inches

Annual air temperature: 41 to 44 degrees F

Frost-free period: 90 to 110 days

Taxonomic Class: Fine, montmorillonitic Typic Haploborolls

Typical Pedon

Winifred clay loam, in an area of Linwell-Winifred clay loams, 15 to 45 percent slopes, in rangeland, 200 feet west and 500 feet north of the southeast corner of sec. 13, T. 21 N., R. 8 E.

A—0 to 4 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; strong medium granular structure; hard, friable, sticky and plastic; many fine and very fine and common medium roots; mildly alkaline; clear smooth boundary.

Bw—4 to 15 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; many fine and very fine and common medium roots; many very fine tubular pores; mildly alkaline; clear wavy boundary.

Bk1—15 to 24 inches; grayish brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) moist; moderate fine and medium subangular blocky structure; hard, friable, sticky and plastic; common fine and very fine and few medium roots; common very fine tubular pores; few fine masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bk2—24 to 34 inches; light brownish gray (10YR 6/2) clay loam, dark grayish brown (10YR 4/2) moist; moderate fine and medium subangular blocky

structure; hard, friable, sticky and plastic; common fine and very fine roots; many very fine tubular pores; common fine seams and masses of lime; strongly effervescent; gradual wavy boundary.

Cr—34 inches; light brownish gray (2.5Y 6/2) and grayish brown (2.5Y 5/2) shale, grayish brown (2.5Y 5/2) and dark grayish brown (2.5Y 4/2) moist; slightly effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 8 to 15 inches

Content of clay in the control section: 35 to 50 percent

Depth to bedrock: 20 to 40 inches

A horizon

Hue: 10YR or 2.5Y

Value: 3, 4, or 5 dry; 2 or 3 moist

Chroma: 2 or 3

Clay content: 27 to 40 percent

Rock fragments: 0 to 35 percent—0 to 20 percent cobbles, 0 to 15 percent pebbles

Reaction: pH 6.6 to 7.8

Bw horizon

Hue: 10YR or 2.5Y

Value: 4 or 5 dry, 3 or 4 moist

Chroma: 2 or 3

Texture: clay loam, silty clay, clay, silty clay loam

Clay content: 35 to 50 percent

Rock fragments: 0 to 15 percent—0 to 10 percent cobbles, 0 to 5 percent pebbles

Effervescence: none to strongly

Reaction: pH 7.4 to 8.4

Bk horizons

Hue: 10YR or 2.5Y

Value: 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 2 or 3

Texture: clay, silty clay, silty clay loam, clay loam

Clay content: 35 to 50 percent

Rock fragments: 0 to 15 percent—0 to 10 percent cobbles, 0 to 5 percent pebbles

Calcium carbonate equivalent: 5 to 15 percent

Gypsum: 1 to 5 percent

Reaction: pH 7.4 to 9.0

Winkler Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Somewhat excessively drained

Permeability: Moderately rapid (2.0 to 6.0 inches/hour)

Landform: Mountains

Parent material: Colluvium from igneous rocks

Slope range: 25 to 60 percent
Annual precipitation: 18 to 22 inches
Annual air temperature: 40 to 43 degrees F
Frost-free period: 70 to 100 days

Taxonomic Class: Loamy-skeletal, mixed, frigid Typic Ustochrepts

Typical Pedon

Winkler gravelly sandy loam, in an area of Winkler-Ambrant complex, 25 to 60 percent slopes, in forest, 2,200 feet south and 1,400 feet west of the northeast corner of sec. 2, T. 28 N., R. 15 E.

O—2 inches to 0; slightly decomposed forest litter.

A—0 to 3 inches; dark grayish brown (10YR 4/2) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; strong fine and very fine granular structure; soft, very friable, nonsticky and nonplastic; many fine and very fine and common medium roots; 15 percent angular pebbles; slightly acid; clear smooth boundary.

E—3 to 10 inches; light brownish gray (10YR 6/2) gravelly sandy loam, grayish brown (10YR 5/2) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many fine and very fine and common medium roots; many very fine tubular pores; 25 percent angular pebbles; neutral; clear wavy boundary.

E and Bt—10 to 18 inches; E part (60 percent) is light brownish gray (10YR 6/2) very gravelly sandy loam, grayish brown (10YR 5/2) moist that surrounds the B part; B part (40 percent) is brown (10YR 5/3) very gravelly sandy loam lamellae, brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many fine and very fine and few medium roots; many very fine tubular pores; 35 percent angular pebbles, 5 percent cobbles; neutral; gradual wavy boundary.

Bw1—18 to 36 inches; brown (10YR 5/3) extremely gravelly sandy loam, dark brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; common fine, very fine and few medium roots; many very fine tubular and irregular pores; 55 percent angular pebbles, 10 percent cobbles; slightly acid; gradual wavy boundary.

Bw2—36 to 60 inches; brown (10YR 5/3) extremely gravelly sandy loam, dark brown (10YR 4/3) moist;

weak fine subangular blocky structure; slightly hard, very friable, slightly sticky, and nonplastic; few fine and very fine roots; many very fine tubular and irregular pores; 65 percent angular pebbles, 10 percent cobbles; neutral.

Range in Characteristics

Content of clay in the control section: 5 to 15 percent

Rock fragments in the control section: 60 to 85 percent

A horizon

Hue: 7.5YR or 10YR

Value: 3 or 4 moist

Chroma: 2 or 3

Clay content: 5 to 15 percent

Rock fragments: 15 to 60 percent—0 to 5 percent angular cobbles, 15 to 55 percent angular pebbles

Reaction: pH 6.1 to 7.3

E horizon

Hue: 7.5YR or 10YR

Value: 6, 7, or 8 dry; 5, 6, or 7 moist

Chroma: 2, 3, or 4

Texture: sandy loam or loam

Clay content: 5 to 15 percent

Rock fragments: 15 to 60 percent—0 to 5 percent angular cobbles, 15 to 55 percent angular pebbles

Reaction: pH 6.1 to 7.3

E and Bt horizon

Hue: E part 2.5Y, 7.5YR, or 10YR; B part 2.5Y, 5YR, 7.5YR, or 10YR

Value: E part 6, 7, or 8, B part 4, 5, or 6 dry;

E part 5, 6, or 7, B part 4 or 5 moist

Chroma: E part 2, 3, or 4; B part 3 or 4

Texture: fine sandy loam, sandy loam, or loam

Clay content: 5 to 15 percent, lamellae have less than 5 percent increase in clay

Rock fragments: 60 to 85 percent—10 to 25 percent angular cobbles, 50 to 60 percent angular pebbles

Reaction: pH 5.6 to 6.5

Bw horizons

Hue: 7.5YR or 10YR

Value: 5, 6, or 7 dry; 4 or 5 moist

Chroma: 2 or 3

Texture: sandy loam or fine sandy loam

Clay content: 5 to 15 percent

Rock fragments: 60 to 85 percent—10 to 25 percent angular cobbles, 50 to 60 percent angular pebbles

Reaction: pH 5.6 to 7.3

680F—Winkler-Ambrant complex, 25 to 60 percent slopes

Setting

Landform:

- * Winkler—Mountains
- * Ambrant—Mountains
- * Winkler—Mountains

Position on landform:

- * Winkler—Backslopes and footslopes
- * Ambrant—Backslopes and footslopes
- * Winkler—Backslopes and footslopes

Slope:

- * Winkler—25 to 60 percent, northeast aspect
- * Ambrant—25 to 60 percent
- * Winkler—25 to 60 percent, southwest aspect

Mean annual precipitation: 18 to 22 inches

Frost-free period: 70 to 100 days

Composition

Major Components

Winkler and similar soils: 35 percent
 Ambrant and similar soils: 25 percent
 Winkler and similar soils: 25 percent

Minor Components

Perma and similar soils: 0 to 5 percent
 Belain and similar soils: 0 to 4 percent
 Whitlash and similar soils: 0 to 2 percent
 Lacey Creek, cool soils: 0 to 2 percent
 Eagle Creek and similar soils: 0 to 2 percent

Major Component Description

Winkler

Surface layer texture: Gravelly sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Igneous colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.1 inches

Ambrant

Surface layer texture: Sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Colluvium or residuum
Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.7 inches

Winkler

Surface layer texture: Gravelly sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Igneous colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.1 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Work Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderately slow (0.2 to 0.6 inch/hour)
Landform: Alluvial fans, stream terraces, hills
Parent material: Alluvium
Slope range: 0 to 35 percent
Annual precipitation: 17 to 19 inches
Annual air temperature: 41 to 44 degrees F
Frost-free period: 90 to 110 days

Taxonomic Class: Fine, montmorillonitic Typic Argiborolls

Typical Pedon

Work clay loam, 4 to 8 percent slopes, in cropland, 1,250 feet east and 200 feet north of the southwest corner of sec. 14, T. 21 N., R. 9 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) clay loam, very dark brown (10YR 2/2) moist; moderate fine and medium granular structure; soft, very friable, sticky and plastic; common fine and very fine roots; neutral; abrupt smooth boundary.

Bt1—6 to 14 inches; dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; hard, friable, sticky and plastic; common fine and very fine roots; common very fine tubular

pores; many distinct clay films on faces of peds; neutral; clear wavy boundary.

Bt2—14 to 22 inches; brown (10YR 5/3) clay, dark brown (10YR 4/3) moist; strong medium prismatic structure parting to strong fine and medium subangular blocky; very hard, firm, sticky and plastic; few very fine roots; common very fine tubular pores; common distinct clay films on faces of peds; mildly alkaline; clear wavy boundary.

Btk—22 to 36 inches; light brownish gray (10YR 6/2) clay loam, dark grayish brown (10YR 4/2) moist; weak medium prismatic structure parting to strong fine and medium subangular blocky; very hard, firm, sticky and plastic; few very fine and fine roots; common very fine tubular pores; few faint clay films on faces of peds; few fine masses of lime; slightly effervescent; mildly alkaline; clear wavy boundary.

Bk—36 to 48 inches; light brownish gray (10YR 6/2) clay loam, grayish brown (10YR 5/2) moist; weak coarse prismatic structure; hard, friable, sticky and plastic; few fine roots; many very fine tubular pores; 10 percent pebbles; common fine seams of lime; strongly effervescent; mildly alkaline; clear wavy boundary.

BCK—48 to 60 inches; grayish brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) moist; massive; hard, friable, sticky and plastic; many very fine tubular pores; common fine seams of lime; strongly effervescent; moderately alkaline.

Range in Characteristics

Mollic epipedon thickness: 10 to 16 inches (includes all or part of the Bt horizons)

Content of clay in the control section: 35 to 50 percent

Depth to the Btk horizon: 12 to 30 inches

Ap horizon

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 2 or 3

Texture: loam or clay loam

Clay content: 20 to 35 percent

Rock fragments: 0 to 60 percent—0 to 30 percent stones or cobbles, 0 to 30 percent pebbles

Reaction: pH 6.1 to 7.8

Bt horizons

Value: 4 or 5 dry; 2, 3, or 4 moist

Chroma: 2 or 3

Texture: clay loam, clay, silty clay

Clay content: 35 to 50 percent and more than 15 percent fine sand and coarser

Rock fragments: 0 to 15 percent—0 to 5 percent cobbles or stones, 0 to 10 percent pebbles

Reaction: pH 6.6 to 7.8

Btk horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 or 3

Texture: clay or clay loam

Clay content: 20 to 40 percent

Rock fragments: 0 to 15 percent—0 to 5 percent cobbles or stones, 0 to 10 percent pebbles

Calcium carbonate equivalent: 3 to 12 percent

Reaction: pH 7.4 to 7.8

Bk and BCK horizons

Hue: 10YR or 2.5Y

Value: 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 2, 3, or 4

Texture: loam or clay loam

Clay content: 15 to 40 percent

Rock fragments: 0 to 35 percent—0 to 5 percent cobbles, 0 to 30 percent pebbles

Calcium carbonate equivalent: 5 to 15 percent

86B—Work clay loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Slope: 0 to 4 percent

Mean annual precipitation: 17 to 19 inches

Frost-free period: 90 to 110 days

Composition

Major Components

Work and similar soils: 85 percent

Minor Components

Absarokee and similar soils: 0 to 5 percent

Work loam: 0 to 3 percent

Cobbly surface layers: 0 to 3 percent

Very gravelly substratum: 0 to 2 percent

Farnuf and similar soils: 0 to 2 percent

Major Component Description

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.1 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

86C—Work clay loam, 4 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Slope: 4 to 8 percent
Mean annual precipitation: 17 to 19 inches
Frost-free period: 90 to 110 days

Composition

Major Components

Work and similar soils: 85 percent

Minor Components

Absarokee and similar soils: 0 to 5 percent
 Work loam: 0 to 3 percent
 Cobbly surface layers: 0 to 3 percent
 Farnuf and similar soils: 0 to 2 percent
 Very gravelly substratums: 0 to 2 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.1 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

86D—Work clay loam, 8 to 15 percent slopes

Setting

Landform: Alluvial fans
Slope: 8 to 15 percent
Mean annual precipitation: 17 to 19 inches
Frost-free period: 90 to 110 days

Composition

Major Components

Work and similar soils: 85 percent

Minor Components

Absarokee and similar soils: 0 to 5 percent
 Very cobbly surface layers: 0 to 5 percent
 Roy and similar soils: 0 to 3 percent
 Very gravelly substratums: 0 to 2 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.1 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

701E—Work-Absarokee clay loams, 8 to 25 percent slopes

Setting

Landform:
 * Work—Hills
 * Absarokee—Hills
Position on landform:
 * Work—Footslopes
 * Absarokee—Backslopes
Slope:
 * Work—8 to 15 percent
 * Absarokee—8 to 25 percent

Mean annual precipitation: 17 to 19 inches
Frost-free period: 90 to 110 days

Composition

Major Components

Work and similar soils: 50 percent
 Absarokee and similar soils: 35 percent

Minor Components

Cabba and similar soils: 0 to 5 percent
 Stony surface layers: 0 to 5 percent
 Whitlash and similar soils: 0 to 2 percent
 Perma and similar soils: 0 to 2 percent
 Areas of rock outcrop: 0 to 1 percent

Major Component Description

Work

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.1 inches

Absarokee

Surface layer texture: Clay loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Interbedded sandstone and shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.9 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

702E—Work-Absarokee stony loams, 8 to 35 percent slopes

Setting

Landform:

- * Work—Hills
- * Absarokee—Hills

Position on landform:

- * Work—Footslopes
- * Absarokee—Backslopes

Slope:

- * Work—8 to 35 percent
- * Absarokee—8 to 35 percent

Mean annual precipitation: 17 to 19 inches
Frost-free period: 90 to 110 days

Composition

Major Components

Work and similar soils: 50 percent
 Absarokee and similar soils: 40 percent

Minor Components

Reeder and similar soils: 0 to 3 percent
 Whitlash and similar soils: 0 to 2 percent
 Very stony surface layers: 0 to 1 percent
 Bouldery surface layers: 0 to 1 percent
 Perma and similar soils: 0 to 2 percent
 Areas of rock outcrop: 0 to 1 percent

Major Component Description

Work

Surface layer texture: Stony loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.0 inches

Absarokee

Surface layer texture: Stony loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Interbedded sandstone and shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.8 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

863E—Work-Roy complex, 8 to 25 percent slopes

Setting

Landform:

- * Work—Alluvial fans
- * Roy—Alluvial fans

Slope:

- * Work—8 to 25 percent
- * Roy—8 to 25 percent

Mean annual precipitation: 17 to 19 inches

Frost-free period: 90 to 110 days

Composition

Major Components

Work and similar soils: 50 percent
Roy and similar soils: 40 percent

Minor Components

Thick, dark surface layers: 0 to 5 percent
Very cobbly sandy loam soils: 0 to 3 percent
Farnuf and similar soils: 0 to 2 percent

Major Component Description

Work

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.0 inches

Roy

Surface layer texture: Stony loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.5 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Yamacall Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Alluvial fans, stream terraces, small drainageways

Parent material: Alluvium

Slope range: 0 to 15 percent

Annual precipitation: 11 to 14 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 105 to 125 days

Taxonomic Class: Fine-loamy, mixed, frigid Aridic Ustochrepts

Typical Pedon

Yamacall loam, 0 to 4 percent slopes, in rangeland, 1,650 feet east and 300 feet south of the northwest corner of sec. 24, T. 26 N., R. 11 E.

A—0 to 4 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; moderate fine and medium granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; mildly alkaline; clear smooth boundary.

Bw—4 to 12 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; moderate medium and coarse prismatic structure parting to moderate fine and medium subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine tubular pores; slightly effervescent; mildly alkaline; clear wavy boundary.

Bk—12 to 18 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; weak fine and medium prismatic structure parting to weak fine subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine tubular pores; few fine masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

BCK—18 to 26 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; common fine and few medium masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

BC—26 to 60 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; slightly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 18 to 35 percent

Depth to the Bk horizon: 10 to 20 inches

Soil phases: Calcareous

A horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5 or 6 dry; 3, 4, or 5 moist

Chroma: 2, 3, or 4

Texture: loam or clay loam

Clay content: 18 to 35 percent

Rock fragments: 0 to 15 percent—0 to 5 percent

cobbles, 0 to 10 percent pebbles

Effervescence: none to strongly

Reaction: pH 6.6 to 8.4

This horizon when mixed to 7 inches will not meet the requirements for a mollic epipedon

Bw horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 2, 3, or 4

Texture: loam, clay loam, or silt loam

Clay content: 18 to 35 percent with 15 to 35 percent fine sand and coarser

Rock fragments: 0 to 15 percent—0 to 5 percent

cobbles, 0 to 10 percent pebbles

Effervescence: none to strongly

Reaction: pH 6.6 to 8.4

Bk horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5, 6, 7, or 8 dry; 4, 5, or 6 moist

Chroma: 2, 3, or 4

Texture: loam, clay loam, or silt loam

Clay content: 18 to 35 percent with 15 to 35 percent fine sand and coarser

Rock fragments: 0 to 15 percent—0 to 5 percent cobbles, 0 to 10 percent pebbles

Electrical conductivity: 0 to 4 mmhos/cm

Calcium carbonate equivalent: 5 to 15 percent

Effervescence: strongly or violently

Reaction: pH 7.9 to 9.0

Some pedons have a BC horizon

B_{Ck} horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma: 2, 3, or 4

Texture: loam, fine sandy loam, clay loam, or silt loam; in some pedons below a depth of 40 inches the material consists of strata of loam, silt loam, sandy loam, and loamy sand

Clay content: 15 to 35 percent

Rock fragments: 0 to 25 percent—0 to 5 percent cobbles, 0 to 20 percent pebbles

Electrical conductivity: 0 to 4 mmhos/cm

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.9 to 9.0

793B—Yamacall clay loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans, stream terraces, and drainageways

Slope: 0 to 4 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Yamacall and similar soils: 85 percent

Minor Components

Stratified, sandy substratum: 0 to 10 percent

Saline and sodic soils: 0 to 5 percent

Major Component Description

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 10.3 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

793C—Yamacall clay loam, 4 to 8 percent slopes

Setting

Landform: Alluvial fans

Slope: 4 to 8 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Yamacall and similar soils: 85 percent

Minor Components

Stratified, sandy substratum: 0 to 8 percent

Saline and sodic soils: 0 to 3 percent

Silty clay surface layers: 0 to 2 percent

Very gravelly surface layers: 0 to 2 percent

Major Component Description

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 10.3 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

79B—Yamacall loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans, stream terraces, and drainageways

Slope: 0 to 4 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Yamacall and similar soils: 85 percent

Minor Components

Calcareous surface layers: 0 to 10 percent

Yamacall fine sandy loam: 0 to 3 percent

Busby and similar soils: 0 to 2 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.7 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

79C—Yamacall loam, 4 to 8 percent slopes

Setting

Landform: Alluvial fans

Slope: 4 to 8 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Yamacall and similar soils: 85 percent

Minor Components

Calcareous surface layers: 0 to 8 percent

Saline and sodic soils: 0 to 3 percent

Yamacall fine sandy loam: 0 to 2 percent

Busby and similar soils: 0 to 2 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.7 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

79D—Yamacall loam, 8 to 15 percent slopes

Setting

Landform: Alluvial fans

Slope: 8 to 15 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Yamacall and similar soils: 85 percent

Minor Components

Calcareous surface layers: 0 to 5 percent
Very gravelly surface layers: 0 to 2 percent
Saline and sodic soils: 0 to 2 percent
Busby and similar soils: 0 to 2 percent
Delpoint and similar soils: 0 to 2 percent
Slopes more than 15 percent: 0 to 2 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.7 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

795C—Yamacall-Benz clay loams, 2 to 8 percent slopes

Setting

Landform:

* Yamacall—Alluvial fans

* Benz—Alluvial fans

Slope:

* Yamacall—2 to 8 percent

* Benz—2 to 8 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Yamacall and similar soils: 50 percent

Benz and similar soils: 35 percent

Minor Components

Strongly saline, loamy soils: 0 to 5 percent

Marvan and similar soils: 0 to 5 percent

Vanda and similar soils: 0 to 3 percent

Busby and similar soils: 0 to 2 percent

Major Component Description

Yamacall

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 10.3 inches

Benz

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Salt affected: Saline within 30 inches

Sodium affected: Sodic within 30 inches

Available water capacity: Mainly 6.6 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

795D—Yamacall-Benz clay loams, 8 to 15 percent slopes

Setting

Landform:

* Yamacall—Alluvial fans

* Benz—Alluvial fans

Slope:

* Yamacall—8 to 15 percent

* Benz—8 to 15 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Yamacall and similar soils: 50 percent

Benz and similar soils: 35 percent

Minor Components

Strongly saline, loamy soils: 0 to 5 percent

Marvan and similar soils: 0 to 5 percent

Vanda similar soils: 0 to 3 percent

Busby and similar soils: 0 to 2 percent

Major Component Description

Yamacall

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 10.3 inches

Benz

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Salt affected: Saline within 30 inches

Sodium affected: Sodic within 30 inches

Available water capacity: Mainly 6.6 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

605C—Yamacall-Havre loams, 0 to 8 percent slopes

Setting

Landform:

* Yamacall—Alluvial fans and stream terraces

* Havre—Flood plains

Slope:

* Yamacall—2 to 8 percent

* Havre—0 to 2 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Yamacall and similar soils: 45 percent

Havre and similar soils: 40 percent

Minor Components

Busby and similar soils: 0 to 3 percent

Glendive and similar soils: 0 to 3 percent

Strongly saline soils: 0 to 3 percent

Kobase and similar soils: 0 to 2 percent

Very gravelly soils: 0 to 2 percent

Poorly drained soils: 0 to 2 percent

Major Component Description

Yamacall

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.7 inches

Havre

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Available water capacity: Mainly 9.7 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Yawdim Series

Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Hills, escarpments
Parent material: Residuum from shale
Slope range: 25 to 70 percent
Annual precipitation: 11 to 14 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 105 to 125 days

Taxonomic Class: Clayey, montmorillonitic (calcareous), frigid, shallow Aridic Ustorthents

Typical Pedon

Yawdim silty clay loam, in an area of Mego-not-Yawdim silty clay loams, 25 to 60 percent slopes, in rangeland, 3,200 feet west and 2,400 feet south of the northeast corner of sec. 30, T. 25 N., R. 9 E.

- A—0 to 3 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; moderate fine granular structure; soft, friable, sticky and plastic; few very fine roots; slightly effervescent; mildly alkaline; clear smooth boundary.
- C—3 to 16 inches; grayish brown (2.5Y 5/2) silty clay loam, olive brown (2.5Y 4/4) moist; weak fine platy structure; hard, firm, sticky and plastic; few very fine roots; 60 percent soft shale chips; slightly effervescent; mildly alkaline; gradual wavy boundary.
- Cr—16 to 60 inches; light brownish gray (2.5Y 6/2) shale, olive brown (2.5Y 4/4) moist; few very fine roots following plates in upper part; slightly effervescent; mildly alkaline.

Range in Characteristics

Content of clay in the control section: 35 to 50 percent
Depth to the Cr horizon: 10 to 20 inches

A horizon

Hue: 10YR or 2.5Y
 Value: 5 or 6 dry, 3 or 4 moist
 Chroma: 1 or 2
 Clay content: 27 to 40 percent
 Reaction: pH 6.6 to 7.8

C horizon

Hue: 10YR, 2.5Y, or 5Y
 Value: 5, 6, 7, or 8 dry; 4, 5, or 6 moist
 Chroma: 1, 2, 3, or 4
 Texture: silty clay loam, clay loam, or clay
 Clay content: 35 to 50 percent
 Reaction: pH 7.4 to 8.4

Yetull Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Somewhat excessively drained
Permeability: Rapid (6.0 to 20.0 inches/hour)
Landform: Sand dunes, hills
Parent material: Alluvium, eolian deposits
Slope range: 0 to 70 percent
Annual precipitation: 11 to 14 inches
Annual air temperature: 42 to 45 degrees F
Frost-free period: 105 to 125 days

Taxonomic Class: Mixed, frigid Typic Ustipsamments

Typical Pedon

Yetull loamy fine sand, in an area of Chinook-Yetull complex, 2 to 10 percent slopes, in cropland, 1,200 feet south and 800 feet west of the northeast corner of sec. 27, T. 24 N., R. 7 E.

- Ap—0 to 6 inches; pale brown (10YR 6/3) loamy fine sand, dark grayish brown (10YR 4/2) moist; weak medium granular structure; soft, very friable, nonsticky and nonplastic; common fine and medium roots; strongly effervescent; moderately alkaline; abrupt smooth boundary.
- C1—6 to 14 inches; pale brown (10YR 6/3) loamy fine sand, dark grayish brown (10YR 4/2) moist; weak coarse prismatic structure; soft, very friable, nonsticky and nonplastic; few fine and very fine roots many fine and very fine pores; strongly effervescent; moderately alkaline; gradual wavy boundary.

C2—14 to 60 inches; pale brown (10YR 6/3) fine sand, dark grayish brown (10YR 4/2) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; many fine and very fine pores; strongly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 0 to 10 percent

A horizon

Hue: 10YR to 2.5Y
Value: 5 or 6 dry, 3 or 4 moist
Chroma: 2, 3, or 4
Texture: Fine sand, loamy fine sand, or fine sandy loam
Clay content: 0 to 10 percent
Effervescence: none to strongly
Reaction: pH 6.6 to 8.4

C1 horizon

Hue: 10YR or 2.5Y
Value: 4, 5, or 6 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Texture: sand, fine sand, loamy sand, loamy coarse sand, loamy fine sand, or coarse sand
Clay content: 0 to 10 percent
Rock fragments: 0 to 15 percent pebbles
Effervescence: slightly or strongly
Reaction: pH 7.4 to 8.4

C2 horizon

Hue: 10YR or 2.5Y
Value: 4, 5, or 6 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Texture: sand, fine sand, loamy sand, loamy coarse sand, loamy fine sand, or coarse sand
Clay content: 0 to 10 percent
Rock fragments: 0 to 15 percent pebbles
Effervescence: slightly, strongly, or violently
Reaction: pH 7.4 to 8.4

93F—Yetull fine sandy loam, 15 to 45 percent slopes

Setting

Landform: Hills
Slope: 15 to 45 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Yetull and similar soils: 85 percent

Minor Components

Busby and similar soils: 0 to 4 percent
Lambeth and similar soils: 0 to 3 percent
Fleak and similar soils: 0 to 3 percent
Tinsley and similar soils: 0 to 2 percent
Slopes more than 45 percent: 0 to 2 percent
Ponderosa pine (eastern part): 0 to 1 percent

Major Component Description

Surface layer texture: Fine sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.2 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

731F—Yetull-Dune land complex, 15 to 45 percent slopes

Setting

Landform:
* Yetull—Sand dunes
* Dune land—Sand dunes
Slope: 15 to 45 percent
Mean annual precipitation: 11 to 14 inches
Frost-free period: 105 to 125 days

Composition

Major Components

Yetull and similar soils: 50 percent
Dune land: 40 percent

Minor Components

Lonesome and similar soils: 0 to 10 percent

Major Component Description

Yetull

Surface layer texture: Fine sand
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Eolian deposits
Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 3.6 inches

Dune land

Definition: Sand in ridges and intervening troughs that shift with the wind

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

73B—Yetull-Lonesome loamy fine sands, 0 to 6 percent slopes

Setting

Landform:

* Yetull—Sand dunes

* Lonesome—Stream terraces

Slope:

* Yetull—0 to 6 percent

* Lonesome—0 to 6 percent

Mean annual precipitation: 11 to 14 inches

Frost-free period: 105 to 125 days

Composition

Major Components

Yetull and similar soils: 45 percent

Lonesome and similar soils: 40 percent

Minor Components

Lihen and similar soils: 0 to 10 percent

Chinook and similar soils: 0 to 5 percent

Major Component Description

Yetull

Surface layer texture: Loamy fine sand

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Eolian deposits

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 3.6 inches

Lonesome

Surface layer texture: Loamy fine sand

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Eolian deposits

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.5 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Zahill Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Slow (0.06 to 0.2 inch/hour)

Landform: Till plains, hills

Parent material: Glacial till

Slope range: 2 to 60 percent

Annual precipitation: 14 to 17 inches

Annual air temperature: 42 to 45 degrees F

Frost-free period: 100 to 120 days

Taxonomic Class: Fine-loamy, mixed (calcareous), frigid Typic Ustorthents

Typical Pedon

Zahill clay loam, 25 to 60 percent slopes, in rangeland, 900 feet east and 1,100 feet north of the southwest corner of sec. 34, T. 23 N., R. 8 E.

A—0 to 3 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; strong fine granular structure; soft, very friable, slightly sticky and slightly plastic; many fine and very fine roots; slightly effervescent; moderately alkaline; clear smooth boundary.

Bk—3 to 18 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, sticky and plastic; common very fine and fine roots; common very fine tubular pores; few fine seams of lime; strongly effervescent; moderately alkaline; clear wavy boundary.

C—18 to 60 inches; light yellowish brown (2.5Y 6/4) clay loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, friable, sticky and plastic; few fine roots; common very fine tubular pores; slightly effervescent; moderately alkaline.

Range in Characteristics

Content of clay in the control section: 20 to 35 percent

Ap horizon

Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Clay content: 27 to 35 percent
Rock fragments: 0 to 35 percent—0 to 15 percent
cobbles and stones, 0 to 20 percent pebbles
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.4 to 8.4

Bk horizon

Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: loam or clay loam
Clay content: 20 to 35 percent
Rock fragments: 0 to 15 percent—0 to 5 percent
stones or cobbles, 0 to 10 percent pebbles
Calcium carbonate equivalent: 8 to 15 percent
Effervescence: strongly or violently
Reaction: pH 7.4 to 8.4

C horizon

Hue: 10YR, 2.5Y, or 5Y
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 2, 3, or 4
Texture: loam or clay loam
Clay content: 20 to 35 percent
Rock fragments: 0 to 15 percent—0 to 5 percent
stones or cobbles, 0 to 10 percent pebbles
Effervescence: slightly or strongly
Gypsum content: 1 to 5 percent
Reaction: pH 7.4 to 9.0

72F—Zahill clay loam, 25 to 60 percent slopes

Setting

Landform: Hills
Slope: 25 to 60 percent
Mean annual precipitation: 14 to 17 inches
Frost-free period: 100 to 120 days

Composition

Major Components

Zahill and similar soils: 85 percent

Minor Components

Sunburst and similar soils: 0 to 5 percent
Slopes less than 25 percent: 0 to 5 percent
Cabba and similar soils: 0 to 2 percent
Moderately deep, loamy soils: 0 to 2 percent
Tinsley and similar soils: 0 to 1 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.6 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

723F—Zahill-Cabba complex, 15 to 45 percent slopes

Setting

Landform:
* Zahill—Hills
* Cabba—Hills
Position on landform:
* Zahill—Backslopes and shoulders
* Cabba—Backslopes and footslopes
Slope:
* Zahill—15 to 45 percent
* Cabba—15 to 45 percent
Mean annual precipitation: 14 to 17 inches
Frost-free period: 100 to 120 days

Composition

Major Components

Zahill and similar soils: 50 percent
Cabba and similar soils: 35 percent

Minor Components

Slopes more than 45 percent: 0 to 5 percent
Amor and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 3 percent
Shallow, sandy soils: 0 to 2 percent

Major Component Description

Zahill

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.6 inches

Cabba

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Interbedded sandstone and shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.5 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

722F—Zahill-Sagedale-Wayden complex, 15 to 45 percent slopes

Setting

Landform:

- * Zahill—Hills
- * Sagedale—Hills
- * Wayden—Hills

Position on landform:

- * Zahill—Backslopes and shoulders
- * Sagedale—Footslopes
- * Wayden—Backslopes

Slope:

- * Zahill—15 to 45 percent
- * Sagedale—15 to 45 percent
- * Wayden—15 to 45 percent

Mean annual precipitation: 14 to 17 inches
Frost-free period: 100 to 120 days

Composition

Major Components

Zahill and similar soils: 40 percent
Sagedale and similar soils: 25 percent
Wayden and similar soils: 20 percent

Minor Components

Tally and similar soils: 0 to 8 percent
Moderately deep, clayey soils: 0 to 5 percent
Areas of rock outcrop: 0 to 2 percent

Major Component Description

Zahill

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.6 inches

Sagedale

Surface layer texture: Silty clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.4 inches

Wayden

Surface layer texture: Silty clay loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.9 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

721E—Zahill-Vida clay loams, 8 to 25 percent slopes

Setting

Landform:

- * Zahill—Hills
- * Vida—Hills

Position on landform:

- * Zahill—Backslopes and shoulders
- * Vida—Footslopes

Slope:

- * Zahill—8 to 25 percent
- * Vida—8 to 15 percent

Mean annual precipitation: 14 to 17 inches

Frost-free period: 100 to 120 days

Composition

Major Components

Zahill and similar soils: 50 percent
Vida and similar soils: 40 percent

Minor Components

Bearpaw and similar soils: 0 to 3 percent
Slopes more than 25 percent: 0 to 3 percent
Moderately deep, loamy soils: 0 to 2 percent
Cabba and similar soils: 0 to 1 percent
Tinsley and similar soils: 0 to 1 percent

Major Component Description

Zahill

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Till

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.6 inches

Vida

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Till

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.6 inches

Management

For management information about this map unit see appropriate sections in Part II of this publication.

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

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Glossary

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvial fan. A body of alluvium, with overflow of water and debris flow deposits, whose surface forms a segment of a cone that radiates downslope from the point where the stream emerges from a narrow valley onto a less sloping surface. Source uplands range in relief and areal extent from mountains to gullied terrains on hill slopes.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Animal-unit-month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillite. Weakly metamorphosed mudstone or shale.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in

inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3.75
Low	3.75 to 5.0
Moderate	5.0 to 7.5
High	more than 7.5

Avalanche chute. The track or path formed by an avalanche.

Back slope. The geomorphic component that forms the steepest inclined surface and principal element of many hill slopes. Back slopes in profile are commonly steep and linear and descend to a foot slope. In terms of gradational process, back slopes are erosional forms produced mainly by mass wasting and running water.

Badland. Steep or very steep, commonly nonstony, barren land dissected by many intermittent drainage channels. Badland is most common in semiarid and arid regions where streams are entrenched in soft geologic material. Local relief generally ranges from 25 to 500 feet. Runoff potential is very high, and geologic erosion is active.

Basal area. The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-floored plain. An extensive nearly level to gently rolling or moderately sloping area that is underlain by hard bedrock and has a slope of 0 to 8 percent.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Blowout. A shallow depression from which all or most of the soil material has been removed by the wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Board foot. A unit of measure of the wood in lumber, logs, or trees. The amount of wood in a board 1 foot wide, 1 foot long, and 1 inch thick before finishing.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks. The steep or very steep broken land at the border of an upland summit that is dissected by ravines.

Breast height. An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management. Use of mechanical, chemical, or biological methods to reduce or eliminate competition from woody vegetation and thus to allow understory grasses and forbs to recover or to make conditions favorable for reseeding. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Cable yarding. A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, a felled tree generally is reeled in while one end is lifted or the entire log is suspended.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Caliche. A more or less cemented deposit of calcium carbonate in soils of warm-temperate, subhumid to arid areas. Caliche occurs as soft, thin layers in the soil or as hard, thick beds just beneath the solum, or it is exposed at the surface by erosion.

California bearing ratio (CBR). The load-supporting capacity of a soil as compared to that of standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

Channeled. Refers to a drainage area in which natural meandering or repeated branching and convergence of a streambed have created deeply incised cuts, either active or abandoned, in alluvial material.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation by use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that loosen the subsoil and bring clods to the surface. A form of emergency tillage to control soil blowing.

Cirque. A semicircular, concave, bowl-like area that has steep faces primarily resulting from erosive activity of a mountain glacier.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clayey soil. Silty clay, sandy clay, or clay.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Clearcut. A method of forest harvesting that removes the entire stand of trees in one cutting. Reproduction is achieved artificially or by natural seeding from the adjacent stands.

Climax plant community. The plant community on a given site that will be established if present environmental conditions continue to prevail and the site is properly managed.

Closed depression. A low area completely surrounded by higher ground and having no natural outlet.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that is 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material is 35 to 60 percent cobbles, and extremely cobbly soil material is more than 60 percent cobbles.

Codominant trees. Trees whose crowns form the general level of the forest canopy and that receive full light from above but comparatively little from the sides.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Commercial forest. Forest land capable of producing 20 cubic feet or more per acre per year at the culmination of mean annual increment.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conglomerate. A coarse grained, clastic rock composed of rounded to subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. Any tillage and planting system in which a cover of crop residue is maintained on at least 30 percent of the soil surface after planting in order to reduce the hazard of water erosion; in areas where soil blowing is the primary concern, a system that maintains a cover of at least 1,000 pounds of flat residue of small grain or the equivalent during the critical erosion period.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—Readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—Adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Consolidated sandstone. Sandstone that disperses within a few hours when fragments are placed in water. The fragments are extremely hard or very

hard when dry, are not easily crushed, and cannot be textured by the usual field method.

Consolidated shale. Shale that disperses within a few hours when fragments are placed in water. The fragments are extremely hard or very hard when dry and are not easily crushed.

Contour stripcropping (or contour farming). Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat). Fecal material deposited in water by aquatic organisms.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Culmination of mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called culmination of mean annual increment.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deep soil. A soil that is 40 to 60 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Dip slope. A slope of the land surface, roughly determined by and approximately conforming with the dip of underlying bedded rock.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming. A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit the use of a full stripcropping pattern.

Dominant trees. Trees whose crowns form the general level of the forest canopy and that receive full light from above and from the sides.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:
Excessively drained.—These soils have very high and high hydraulic conductivity and a low water-holding capacity. They are not suited to crop production unless irrigated.
Somewhat excessively drained.—These soils have high hydraulic conductivity and a low water-holding capacity. Without irrigation, only a narrow range of crops can be grown and yields are low.
Well drained.—These soils have an intermediate water-holding capacity. They retain optimum amounts of moisture, but they are not wet close enough to the surface or long enough during the growing season to adversely affect yields.
Moderately well drained.—These soils are wet close enough to the surface or long enough that planting or harvesting operations or yields of some field crops are adversely affected unless a drainage system is installed. Moderately well drained soils commonly have a layer with low

hydraulic conductivity, a wet layer relatively high in the profile, additions of water by seepage, or some combination of these.

Somewhat poorly drained.—These soils are wet close enough to the surface or long enough that planting or harvesting operations or crop growth is markedly restricted unless a drainage system is installed. Somewhat poorly drained soils commonly have a layer with low hydraulic conductivity, a wet layer high in the profile, additions of water through seepage, or a combination of these.

Poorly drained.—These soils commonly are so wet at or near the surface during a considerable part of the year that field crops cannot be grown under natural conditions. Poorly drained conditions are caused by a saturated zone, a layer with low hydraulic conductivity, seepage, or a combination of these.

Very poorly drained.—These soils are wet to the surface most of the time. The wetness prevents the growth of important crops (except rice) unless a drainage system is installed.

Drainage, surface. Runoff, or surface flow of water, from an area.

Drainageway. An area of ground at a lower elevation than the surrounding ground and in which water collects and is drained to a closed depression or lake or to a drainageway at a lower elevation. A drainageway may or may not have distinctly incised channels at its upper reaches or throughout its course.

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Duff. A term used to identify a generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Dune. A mound, ridge, or hill of loose, windblown granular material (generally sand), either bare or covered with vegetation.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, for example, fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. The term is more often applied to cliffs resulting from differential erosion.

Esker. A long, narrow, sinuous, steep-sided ridge composed of irregularly stratified sand and gravel that were deposited by a subsurface stream flowing between ice walls or through ice tunnels of a retreating glacier and that were left behind when the ice melted. Eskers range from less than a mile to more than 100 miles in length and from 10 to 100 feet in height.

Even aged. Refers to a stand of trees in which only small differences in age occur between individual trees. A range of 20 years is allowed.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Excess lime (in tables). Excess carbonates in the soil that restrict the growth of some plants.

Excess salts (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Excess sodium (in tables). Excess exchangeable sodium in the soil. The resulting poor physical properties restrict the growth of plants.

Excess sulfur (in tables). Excessive amount of sulfur in the soil. The sulfur causes extreme acidity if the soil is drained, and the growth of most plants is restricted.

Extrusive rock. Igneous rock derived from deep-seated molten matter (magma) emplaced on the earth's surface.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the oven-dry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity*, *normal moisture capacity*, or *capillary capacity*.

Fine textured soil. Sandy clay, silty clay, or clay.

Firebreak. An area cleared of flammable material to stop or help control creeping or running fires. A firebreak also serves as a line from which to work and to facilitate the movement of fire fighters and equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that is, by volume, 15 to 35 percent flagstones. Very flaggy soil material is 35 to 60 percent flagstones, and extremely flaggy soil material is more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to inundation under flood-stage conditions unless protected artificially. It is usually a constructional landform built of sediment deposited during overflow and lateral migration of the stream.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Foothills. A region of relatively low, rounded hills at the base of a mountain range.

Foot slope. The geomorphic component that forms the inner, gently inclined surface at the base of a hill slope. The surface profile is dominantly concave. In terms of gradational processes, a foot slope is a transition zone between an upslope site of erosion (back slope) and a downslope site of deposition (toe slope).

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragile (in tables). A soil that is easily damaged by use or disturbance.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Giant ripple mark. The undulating surface sculpture produced in noncoherent granular materials by currents of water and by the agitation of water in wave action during the draining of large glacial lakes, such as Glacial Lake Missoula.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciated uplands. Land areas that were previously covered by continental or alpine glaciers and that are at a higher elevation than the flood plain.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage. A gullied map unit is one that has numerous gullies.

Gypsum. A mineral consisting of hydrous calcium sulfate.

Habitat type. An aggregation of all land areas capable of producing similar climax plant communities.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Head out. To form a flower head.

Heavy metal. Inorganic substances that are solid at ordinary temperatures and are not soluble in water. They form oxides and hydroxides that are basic. Examples are copper, iron, cadmium, zinc, manganese, lead, and arsenic.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 8 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons of mineral soil are as follows:
O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the number 2 precedes the letter C.

Cr horizon.—Sedimentary beds of consolidated sandstone and semiconsolidated and

consolidated shale. Generally, roots can penetrate this horizon only along fracture planes.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and are less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:
Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.
Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.
Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Kame. A moundlike hill of glacial drift, composed chiefly of stratified sand and gravel.

Kame terrace. A terracelike ridge consisting of stratified sand and gravel that were deposited by a meltwater stream flowing between a melting glacier and a higher valley wall or lateral moraine and that remained after the disappearance of the ice. It is commonly pitted with kettles and has an irregular ice-contact slope.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Lake plain. A surface marking the floor of an extinct lake, filled in by well sorted, stratified sediments.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Lateral moraine. A ridgelike moraine carried on and deposited at the side margin of a valley glacier. It is composed chiefly of rock fragments derived from the valley walls by glacial abrasion and plucking or by mass wasting.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loamy soil. Coarse sandy loam, sandy loam, fine sandy loam, very fine sandy loam, loam, silt loam, silt, clay loam, sandy clay loam, or silty clay loam.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by the wind.

Low-residue crops. Crops such as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Low strength. The soil is not strong enough to support loads.

Marl. An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal amounts.

Mean annual increment (MAI). The average annual increase in volume of a tree during the entire life of the tree.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Merchantable trees. Trees that are of sufficient size to be economically processed into wood products.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Microhigh. An area that is 2 to 12 inches higher than the adjacent microlow.

Microlow. An area that is 2 to 12 inches lower than the adjacent microhigh.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Miscellaneous water. A sewage lagoon, an industrial waste pit, a fish hatchery, or a similar water area.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately deep soil. A soil that is 20 to 40 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Moraine. An accumulation of glacial drift in a topographic landform of its own, resulting chiefly from the direct action of glacial ice. Some types are lateral, recessional, and terminal.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of limited summit area and generally having steep sides (slopes greater than 25 percent) and considerable bare-rock surface. A mountain can occur as a single, isolated mass or in a group forming a chain or range. Mountains are primarily formed by deep-seated earth movements or volcanic action and secondarily by differential erosion.

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Mudstone. Sedimentary rock formed by induration of silt and clay in approximately equal amounts.

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Observed rooting depth. Depth to which roots have been observed to penetrate.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. An extensive area of glaciofluvial material that was deposited by meltwater streams.

Overstory. The trees in a forest that form the upper crown cover.

Oxbow. The horseshoe-shaped channel of a former meander, remaining after the stream formed a cutoff across a narrow meander neck.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan*, *fragipan*, *claypan*, *plowpan*, and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called “a soil.” A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square

meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percolates slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Playa. The generally dry and nearly level lake plain that occupies the lowest parts of closed depressional areas, such as those on intermontane basin floors. Temporary flooding occurs primarily in response to precipitation and runoff.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability or an impermeable layer near the surface, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth).

Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. The application of fire to land under such conditions of weather, soil moisture, and time of day as presumably will result in the intensity of heat and spread required to accomplish specific forest management, wildlife, grazing, or fire hazard reduction purposes.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Quartzite, metamorphic. Rock consisting mainly of quartz that formed through recrystallization of quartz-rich sandstone or chert.

Quartzite, sedimentary. Very hard but unmetamorphosed sandstone consisting chiefly of quartz grains.

Range condition. The present composition of the plant community on a range site in relation to the potential natural plant community for that site. Range condition is expressed as excellent, good, fair, or poor on the basis of how much the present plant community has departed from the potential.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Range site. An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an

association of species that differ from those on other range sites in kind or proportion of species or total production.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Recessional moraine. A moraine formed during a temporary but significant halt in the retreat of a glacier.

Red beds. Sedimentary strata mainly red in color and composed largely of sandstone and shale.

Regeneration. The new growth of a natural plant community, developing from seed.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relict stream terrace. One of a series of platforms in or adjacent to a stream valley that formed prior to the current stream system.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Riser. The relatively short, steeply sloping area below a terrace tread that grades to a lower terrace tread or base level.

Riverwash. Unstable areas of sandy, silty, clayey, or gravelly sediments. These areas are flooded, washed, and reworked by rivers so frequently that they support little or no vegetation.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rock outcrop. Exposures of bare bedrock other than lava flows and rock-lined pits.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Rubble land. Areas that have more than 90 percent of the surface covered by stones or boulders. Voids contain no soil material and virtually no vegetation other than lichens. The areas commonly are at the base of mountain slopes, but some are on mountain slopes as deposits of cobbles, stones, and boulders left by Pleistocene glaciation or by periglacial phenomena.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs the growth of plants. A saline soil does not contain excess exchangeable sodium.

Salinity. The electrical conductivity of a saline soil. It is expressed, in millimhos per centimeter, as follows:

Nonsaline	0 to 4
Slightly saline	4 to 8
Moderately saline	8 to 16
Strongly saline	more than 16

Salty water (in tables). Water that is too salty for consumption by livestock.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sandy soil. Sand or loamy sand.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Sawlogs. Logs of suitable size and quality for the production of lumber.

Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to

increase water absorption or to provide a more tillable soil.

Scribner's log rule. A method of estimating the number of board feet that can be cut from a log of a given diameter and length.

Sedimentary plain. An extensive nearly level to gently rolling or moderately sloping area that is underlain by sedimentary bedrock and that has a slope of 0 to 8 percent.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Sedimentary uplands. Land areas of bedrock formed from water- or wind-deposited sediments. They are higher on the landscape than the flood plain.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Semiconsolidated sedimentary beds. Soft geologic sediments that disperse when fragments are placed in water. The fragments are hard or very hard when dry. Determining the texture by the usual field method is difficult.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Shallow soil. A soil that is 10 to 20 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shelterwood system. A forest management system requiring the removal of a stand in a series of cuts so that regeneration occurs under a partial canopy. After regeneration, a final cut removes the shelterwood and allows the stand to develop in the open as an even-aged stand. The system is well suited to sites where shelter is needed for regeneration, and it can aid regeneration of the more intolerant tree species in a stand.

Shoulder slope. The uppermost inclined surface at the top of a hillside. It is the transition zone from the back slope to the summit of a hill or mountain. The surface is dominantly convex in profile and erosional in origin.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the county.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site class. A grouping of site indexes into five to seven production capability levels. Each level can be represented by a site curve.

Site curve (50-year). A set of related curves on a graph that shows the average height of dominant or dominant and codominant trees for the range of ages on soils that differ in productivity. Each level is represented by a curve. The basis of the curves is the height of dominant or dominant and codominant trees that are 50 years old or are 50 years old at breast height.

Site curve (100-year). A set of related curves on a graph that shows the average height of dominant or dominant and codominant trees for a range of ages on soils that differ in productivity. Each level is represented by a curve. The basis of the curves is the height of dominant or dominant and codominant trees that are 100 years old or are 100 years old at breast height.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant or dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Skid trails. Pathways along which logs are dragged to a common site for loading onto a logging truck.

Slash. The branches, bark, treetops, reject logs, and broken or uprooted trees left on the ground after logging.

Slickens. Accumulations of fine textured material, such as material separated in placer-mine and ore-mill operations. Slickens from ore mills commonly consist of freshly ground rock that has undergone chemical treatment during the milling process.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil generally is loamy or clayey, is slippery when wet, and is low in productivity.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey the following slope classes are recognized:

Nearly level	0 to 2 percent
Gently sloping	2 to 4 percent
Moderately sloping	4 to 8 percent
Strongly sloping	8 to 15 percent
Moderately steep	15 to 25 percent
Steep	25 to 45 percent
Very steep	more than 45 percent

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodic (alkali) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^+ to $\text{Ca}^{++} + \text{Mg}^{++}$. The degrees of sodicity and their respective ratios are:

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Species. A single, distinct kind of plant or animal having certain distinguishing characteristics.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Strath terrace. A surface cut formed by the erosion of hard or semiconsolidated bedrock and thinly mantled with stream deposits.

Stream channel. The hollow bed where a natural stream of surface water flows or may flow; the deepest or central part of the bed, formed by the main current and covered more or less continuously by water.

Stream terrace. One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel. It originally formed near the level of the stream and is the dissected remnants of an abandoned flood plain, streambed, or valley floor that were produced during a former stage of erosion or deposition.

Strippcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to soil blowing and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are: *platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter or loosen a layer that is restrictive to roots.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Summit. A general term for the top, or highest level, of an upland feature, such as a hill or mountain. It commonly refers to a higher area that has a gentle slope and is flanked by steeper slopes.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Tailwater. The water directly downstream of a structure.

Talus. Rock fragments of any size or shape, commonly coarse and angular, derived from and lying at the base of a cliff or very steep rock slope. The accumulated mass of such loose, broken rock formed chiefly by falling, rolling, or sliding.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances. It commonly is a massive arcuate ridge or complex of ridges underlain by till and other types of drift.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand*, *loamy sand*, *sandy loam*, *loam*, *silt loam*, *silt*, *sandy clay loam*, *clay loam*, *silty clay loam*, *sandy clay*, *silty clay*, and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). A layer of otherwise suitable soil material that is too thin for the specified use.

Till plain. An extensive nearly level to gently rolling or moderately sloping area that is underlain by or

consists of till and that has a slope of 0 to 8 percent.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill. Toe slopes are commonly gentle and linear in profile.

Too arid (in tables). The soil is dry most of the time, and vegetation is difficult to establish.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Toxicity (in tables). Excessive amount of toxic substances, such as sodium or sulfur, that severely hinder establishment of vegetation or severely restrict plant growth.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Trafficability. The degree to which a soil is capable of supporting vehicular traffic across a wide range in soil moisture conditions.

Tread. The relatively flat terrace surface that was cut or built by stream or wave action.

Tuff. A compacted deposit that is 50 percent or more volcanic ash and dust.

Understory. Any plants in a forest community that grow to a height of less than 5 feet.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley. An elongated depressional area primarily developed by stream action.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Very deep soil. A soil that is more than 60 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Very shallow soil. A soil that is less than 10 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Water-spreading. Diverting runoff from natural channels by means of a system of dams, dikes, or ditches and spreading it over relatively flat surfaces.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near

the earth's surface by atmospheric agents.

These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an oven-dry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The action of uprooting and tipping over trees by the wind.

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In cooperation with
Montana Agricultural
Experiment Station

Soil Survey of Chouteau County Area, Montana Part II



How to Use This Soil Survey

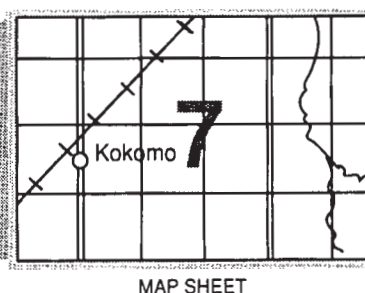
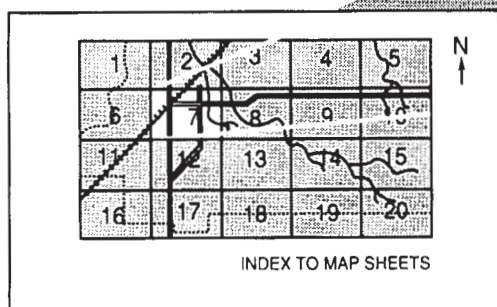
This survey is divided into three parts. Part I includes general information about the survey area; descriptions of the detailed soil map units and soil series in the area; and a description of how the soils formed. Part II describes the use and management of the soils and the major soil properties. This part may be updated as further information about soil management becomes available. Part III includes the maps.

Detailed Soil Maps

The detailed soil maps can be useful in planning the use and management of small areas.

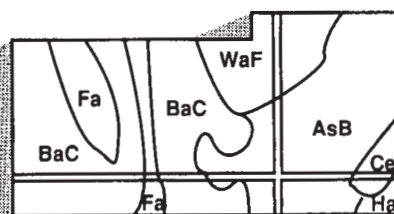
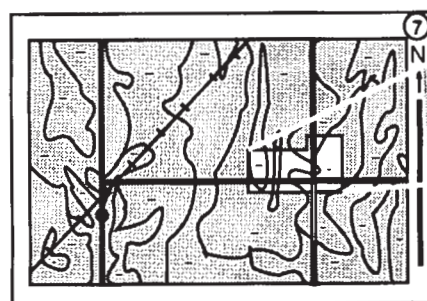
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet and turn to that sheet.

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** in Part I of this survey, which lists the map units by symbol and name and shows the page where each map unit is described.



The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

A **State Soil Geographic Data Base (STATSGO)** is available for this survey area. This



NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

data base consists of a soils map at a scale of 1:250,000 along with groups of associated soils. It replaces the general soils map published in older surveys. This map and its data base can be useful for planning multi-county areas and map output can be tailored for specific use. For more information about the State Soil Geographic Data Base for this survey area, or for any portion of Montana, contact your local Natural Resources Conservation Service office.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1991. Soil names and descriptions were approved in 1992. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1992. This survey was made cooperatively by the Natural Resources Conservation Service; United States Department of the Interior, Bureau of Indian Affairs; and the Montana Agricultural Experiment Station. It is part of the technical assistance furnished to the Chouteau County Conservation District, Big Sandy Conservation District, and the Chippewa-Cree Tribal Council.

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**Cover: White Rocks area of the Missouri River. This area is designated as wild and scenic river.
(Photo by C.P. Heidlebaugh, Loma, Montana.)**

Additional information about the Nation's natural resources is available on the Natural Resources Conservation Service home page on the World Wide Web. The address is <http://www.nrcs.usda.gov> (click on "Technical Resources").

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- 411D—Farnuf-Reeder loams, 4 to 15 percent slopes
- 411E—Reeder-Farnuf loams, 8 to 25 percent slopes
- 421C—Joplin-Hillon loams, 2 to 8 percent slopes
- 422C—Marmarth loam, 2 to 8 percent slopes
- 441C—Kevin-Hillon clay loams, 2 to 8 percent slopes
- 442C—Kevin-Elloam clay loams, 2 to 8 percent slopes
- 444D—Kevin-Scobey clay loams, 8 to 15 percent slopes
- 451C—Turner-Beaverton complex, 2 to 8 percent slopes
- 460—Laceycreek loam, 8 to 25 percent slopes, moist
- 471B—Marias-Kobase complex, 0 to 4 percent slopes
- 481A—Bigsag silty clay, 0 to 2 percent slopes
- 493A—Enbar-Straw-Eagleton loams, 0 to 2 percent slopes
- 503B—Telstad-Joplin loams, 0 to 4 percent slopes
- 503C—Telstad-Joplin loams, 4 to 8 percent slopes

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- 510—Rock outcrop-Belain complex, 15 to 45 percent slopes
- 511A—Martinsdale-Turner loams, 0 to 2 percent slopes
- 511C—Martinsdale loam, 2 to 8 percent slopes
- 512C—Martinsdale stony loam, 4 to 15 percent slopes
- 521B—Thoeny-Elloam-Abscher complex, 0 to 4 percent slopes
- 530F—Warwood loam, 15 to 45 percent slopes
- 531A—Sweetgrass-Beaverton complex, 0 to 2 percent slopes
- 531C—Sweetgrass-Beaverton complex, 2 to 8 percent slopes
- 550F—Libeg-Arrowpeak-Elkner complex, 25 to 70 percent slopes
- 551B—Lonesome loamy fine sand, 0 to 6 percent slopes
- 560F—Elve-Rock outcrop complex, 25 to 70 percent slopes
- 561B—Scobey-Kevin clay loams, 0 to 4 percent slopes
- 561C—Scobey-Kevin clay loams, 4 to 8 percent slopes
- 562B—Scobey-Linnet complex, 0 to 4 percent slopes
- 563A—Fortbenton-Scobey fine sandy loams, 0 to 3 percent slopes
- 580F—Garlet-Elkner complex, 25 to 70 percent slopes
- 601A—Havre-Glendive complex, 0 to 1 percent slopes
- 602A—Havre silty clay loam, 0 to 1 percent slopes
- 603A—Havre-Glendive complex, 0 to 2 percent slopes, occasionally flooded
- 605C—Yamacall-Havre loams, 0 to 8 percent slopes
- 621E—Sagedale-Wayden silty clay loams, 8 to 25 percent slopes
- 621F—Wayden-Sagedale silty clay loams, 25 to 60 percent slopes
- 623F—Linwell-Winifred clay loams, 15 to 45 percent slopes
- 630E—Crow-Lubrecht loams, 8 to 35 percent slopes
- 641F—Norbert-Barkof silty clays, 25 to 60 percent slopes
- 650D—Laceycreek-Ambrant complex, 4 to 15 percent slopes
- 650F—Laceycreek-Eaglecreek loams, 15 to 45 percent slopes
- 653F—Fleak-Twilight-Yetull complex, 25 to 70 percent slopes
- 654F—Fleak-Twilight-Rock outcrop complex, 25 to 70 percent slopes
- 661E—Twilight-Fleak complex, 8 to 25 percent slopes
- 671B—Bearpaw-Vida clay loams, 0 to 4 percent slopes
- 671C—Bearpaw-Vida clay loams, 4 to 8 percent slopes
- 673A—Bearpaw-Daglum complex, 0 to 2 percent slopes
- 674B—Bearpaw-Waltham clay loams, 0 to 4 percent slopes
- 680F—Winkler-Ambrant complex, 25 to 60 percent slopes
- 681C—Gerber clay, 4 to 8 percent slopes
- 691D—Vida-Williams loams, 8 to 15 percent slopes
- 692D—Vida-Bearpaw clay loams, 4 to 15 percent slopes
- 693C—Vida-Bearpaw-Nishon clay loams, 0 to 15 percent slopes
- 701E—Work-Absarokee clay loams, 8 to 25 percent slopes
- 702E—Work-Absarokee stony loams, 8 to 35 percent slopes
- 721E—Zahill-Vida clay loams, 8 to 25 percent slopes
- 722F—Zahill-Sagedale-Wayden complex, 15 to 45 percent slopes
- 723F—Zahill-Cabba complex, 15 to 45 percent slopes

731F—Yetull-Dune land complex, 15 to 45 percent slopes
 741B—Shambo-Straw loams, 0 to 4 percent slopes
 745F—Shambo-Amor-Cabba loams, 15 to 45 percent slopes
 761C—Hedoes-Belain loams, 2 to 8 percent slopes
 761E—Hedoes-Belain loams, 8 to 25 percent slopes
 793B—Yamacall clay loam, 0 to 4 percent slopes
 793C—Yamacall clay loam, 4 to 8 percent slopes
 795C—Yamacall-Benz clay loams, 2 to 8 percent slopes
 795D—Yamacall-Benz clay loams, 8 to 15 percent slopes
 801B—Williams-Vida loams, 0 to 4 percent slopes
 801C—Williams-Vida loams, 4 to 8 percent slopes
 828A—Savage loam, 0 to 2 percent slopes
 842A—Savage-Daglum complex, 0 to 2 percent slopes
 863E—Work-Roy complex, 8 to 25 percent slopes
 871B—Tamaneen cobbly clay loam, 0 to 4 percent slopes
 871C—Tamaneen cobbly clay loam, 4 to 8 percent slopes
 883F—Perma-Whitlash complex, 25 to 70 percent slopes

892F—Whitlash-Belain-Rock outcrop complex, 25 to 60 percent slopes
 895F—Belain-Whitlash, moist-Hedoes complex, 15 to 60 percent slopes
 896E—Belain-Whitlash-Rock outcrop complex, 8 to 25 percent slopes
 911F—Belain-Whitlash-Hedoes complex, 15 to 45 percent slopes
 916C—Belain-Hedoes sandy loams, 2 to 8 percent slopes
 925F—Sunburst-Lambeth complex, 25 to 70 percent slopes
 941D—Busby-Twilight fine sandy loams, 4 to 15 percent slopes
 943C—Tally fine sandy loam, 2 to 8 percent slopes
 943E—Tally-Vebar fine sandy loams, 8 to 25 percent slopes
 943F—Tally-Cohagen fine sandy loams, 25 to 60 percent slopes
 965F—Cabba-Macar loams, 15 to 60 percent slopes
 971F—Neldore-Bascovy silty clays, 25 to 60 percent slopes
 972F—Neldore-Rock outcrop complex, 25 to 70 percent slopes
 974F—Neldore-Hillon complex, 25 to 70 percent slopes
 DA—Denied access
 M-W—Miscellaneous water
 W—Water

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Survey of Chouteau County Area, Montana

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as rangeland and woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Interpretative ratings help engineers, planners, and others understand how soil properties influence important nonagricultural uses, such as building site development and construction materials. The ratings indicate the most restrictive soil features affecting the suitability of the soils for these uses.

Soils are rated in their natural state. No unusual modification of the soil site or material is made other than that which is considered normal practice for the rated use. Even though soils may have limitations, it is important to remember that engineers and others can modify soil features or can design or adjust the plans for a structure to compensate for most of the limitations. Most of these practices, however, are costly. The final decision in selecting a site for a particular use generally involves weighing the costs of site preparation and maintenance.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

The classification and extent of the soils in this survey area are shown in the tables "Classification of the Soils" and "Acreage and Proportionate Extent of the Soils," which are at the end of this section.

Classification of the Soils

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics that are outside the range of the series)

Soil name	Family or higher taxonomic class
Absarokee-----	Fine, montmorillonitic Typic Argiborolls
Absher-----	Fine, montmorillonitic Typic Natriboralfs
Acel-----	Fine, montmorillonitic Mollic Eutroboralfs
Ambrant-----	Coarse-loamy, mixed, frigid Typic Ustochrepts
Amor-----	Fine-loamy, mixed Typic Haploborolls
Arrowpeak-----	Loamy-skeletal, mixed Lithic Cryoborolls
Assinniboine-----	Fine-loamy, mixed Aridic Argiborolls
Attewan-----	Fine-loamy over sandy or sandy-skeletal, mixed Aridic Argiborolls
Barkof-----	Fine, montmorillonitic, frigid Leptic Udic Haplusterts
Bascovy-----	Fine, montmorillonitic, frigid Leptic Udic Haplusterts
Bearpaw-----	Fine, montmorillonitic Typic Argiborolls
Beaverton-----	Loamy-skeletal over sandy or sandy-skeletal, mixed Typic Argiborolls
Belain-----	Coarse-loamy, mixed Typic Haploborolls
Benz-----	Fine-loamy, mixed (calcareous), frigid Aridic Ustorthents
Bigsag-----	Fine, montmorillonitic (calcareous), frigid Typic Halaquepts
Bigsandy-----	Fine-loamy, mixed (calcareous), frigid Typic Fluvaquents
Busby-----	Coarse-loamy, mixed, frigid Aridic Ustochrepts
Cabba-----	Loamy, mixed (calcareous), frigid, shallow Typic Ustorthents
Cabbart-----	Loamy, mixed (calcareous), frigid, shallow Aridic Ustorthents
Chinook-----	Coarse-loamy, mixed Aridic Haploborolls
Cohagen-----	Loamy, mixed (calcareous), frigid, shallow Typic Ustorthents
Cozberg-----	Coarse-loamy, mixed Aridic Haploborolls
Creed-----	Fine, montmorillonitic Typic Natriboralfs
Crow-----	Fine, mixed Glossic Eutroboralfs
Daglum-----	Fine, montmorillonitic Vertic Natriborolls
Degrad-----	Fine-loamy over sandy or sandy-skeletal, mixed Aridic Argiborolls
Delpoint-----	Fine-loamy, mixed, frigid Aridic Ustochrepts
Eaglecreek-----	Fine-loamy, mixed Mollic Eutroboralfs
Eagleton-----	Fine-loamy, mixed, frigid Cumulic Endoaquolls
Elkner-----	Coarse-loamy, mixed Typic Cryochrepts
Elloam-----	Fine, montmorillonitic Typic Natriboralfs
Elve-----	Loamy-skeletal, mixed Typic Cryochrepts
Enbar-----	Fine-loamy, mixed Cumulic Haploborolls
Ethridge-----	Fine, montmorillonitic Aridic Argiborolls
Evanston-----	Fine-loamy, mixed Aridic Argiborolls
Farnuf-----	Fine-loamy, mixed Typic Argiborolls
Ferd-----	Fine, montmorillonitic Glossic Eutroboralfs
Flatcreek-----	Fine, montmorillonitic (calcareous), frigid Vertic Ustifluvents
Fleak-----	Mixed, frigid, shallow Aridic Ustipsamments
Fortbenton-----	Fine-loamy, mixed Aridic Haploborolls
Garlet-----	Loamy-skeletal, mixed Typic Cryochrepts
Gerber-----	Fine, montmorillonitic Vertic Argiborolls
Gerdrum-----	Fine, montmorillonitic Typic Natriboralfs
Glendive-----	Coarse-loamy, mixed (calcareous), frigid Aridic Ustifluvents
Hanly-----	Sandy, mixed, frigid Aridic Ustifluvents
Harlake-----	Fine, montmorillonitic (calcareous), frigid Aridic Ustifluvents
Havre-----	Fine-loamy, mixed (calcareous), frigid Aridic Ustifluvents
Hedoes-----	Coarse-loamy, mixed Pachic Haploborolls
Hillon-----	Fine-loamy, mixed (calcareous), frigid Aridic Ustorthents
Joplin-----	Fine-loamy, mixed Aridic Argiborolls
Kenilworth-----	Fine-loamy, mixed Aridic Argiborolls
Kevin-----	Fine-loamy, mixed Aridic Argiborolls
Klayent-----	Fine, mixed (calcareous), frigid Fluvaquentic Endoaquolls
Kobase-----	Fine, montmorillonitic, frigid Aridic Ustochrepts
Kremlin-----	Fine-loamy, mixed Aridic Haploborolls
Lacey Creek-----	Fine-loamy, mixed Pachic Udic Argiborolls
Lambeth-----	Fine-silty, mixed (calcareous), frigid Aridic Ustorthents
*Lardell-----	Fine-loamy, mixed, frigid Aquollic Salorthids
Libeg-----	Loamy-skeletal, mixed Argic Cryoborolls
Lihen-----	Sandy, mixed Entic Haploborolls

Classification of the Soils--Continued

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics that are outside the range of the series)

Soil name	Family or higher taxonomic class
Linnet-----	Fine, montmorillonitic Ustertic Argiborolls
Linwell-----	Fine, montmorillonitic Typic Haploborolls
Lonesome-----	Sandy over loamy, mixed (calcareous), frigid Aridic Ustorthents
Lonna-----	Fine-silty, mixed, frigid Aridic Ustochrepts
Lubrecht-----	Fine, mixed Glossic Eutroboralfs
Macar-----	Fine-loamy, mixed, frigid Typic Ustochrepts
Marcott-----	Fine, mixed Aquic Haploborolls
Marias-----	Fine, montmorillonitic, frigid Chromic Udic Haplusterts
Marmarth-----	Fine-loamy, mixed Aridic Argiborolls
Martinsdale-----	Fine-loamy, mixed Typic Argiborolls
Marvan-----	Fine, montmorillonitic, frigid Sodic Haplusterts
McIlwaine-----	Coarse-loamy over sandy or sandy-skeletal, mixed Cumulic Haploborolls
Megonot-----	Fine, montmorillonitic, frigid Aridic Ustochrepts
Neldore-----	Clayey, montmorillonitic, nonacid, frigid, shallow Aridic Ustorthents
Nesda-----	Sandy-skeletal, mixed Fluventic Haploborolls
Nishon-----	Fine, montmorillonitic, frigid Typic Albaqualfs
Nobe-----	Fine, montmorillonitic (calcareous), frigid Oxyaquic Ustorthents
Norbert-----	Clayey, montmorillonitic (calcareous), frigid, shallow Typic Ustorthents
Pendroy-----	Very-Fine, montmorillonitic, frigid Chromic Udic Haplusterts
Perma-----	Loamy-skeletal, mixed Typic Haploborolls
Phillips-----	Fine, montmorillonitic Typic Eutroboralfs
Reeder-----	Fine-loamy, mixed Typic Argiborolls
Rivra-----	Sandy-skeletal, mixed, frigid Aridic Ustifluvents
Roy-----	Clayey-skeletal, mixed Typic Argiborolls
Sagedale-----	Fine, montmorillonitic, frigid Typic Ustochrepts
Savage-----	Fine, montmorillonitic Typic Argiborolls
Scobey-----	Fine, montmorillonitic Aridic Argiborolls
Shambo-----	Fine-loamy, mixed Typic Haploborolls
Shane-----	Fine, montmorillonitic Abruptic Argiborolls
Straw-----	Fine-loamy, mixed Cumulic Haploborolls
Sunburst-----	Fine, montmorillonitic (calcareous), frigid Aridic Ustorthents
Sweetgrass-----	Clayey over sandy or sandy-skeletal, montmorillonitic Typic Argiborolls
Tally-----	Coarse-loamy, mixed Typic Haploborolls
Tamaneen-----	Fine, montmorillonitic Typic Argiborolls
Tanna-----	Fine, montmorillonitic Aridic Argiborolls
Telstad-----	Fine-loamy, mixed Aridic Argiborolls
Thoeny-----	Fine, montmorillonitic Typic Natriboralfs
Tinsley-----	Sandy-skeletal, mixed, frigid Typic Ustorthents
Toston-----	Fine-loamy, mixed, frigid Typic Natriboralfs
Turner-----	Fine-loamy over sandy or sandy-skeletal, mixed Typic Argiborolls
Twilight-----	Coarse-loamy, mixed, frigid Aridic Ustochrepts
Vanda-----	Fine, montmorillonitic (calcareous), frigid Aridic Ustorthents
Vebar-----	Coarse-loamy, mixed Typic Haploborolls
Vida-----	Fine-loamy, mixed Typic Argiborolls
Waltham-----	Fine, montmorillonitic Typic Natriboralfs
Warwood-----	Fine-loamy, mixed Glossic Cryoboralfs
Wayden-----	Clayey, montmorillonitic (calcareous), frigid, shallow Typic Ustorthents
Weingart-----	Fine, montmorillonitic Typic Natriboralfs
Whitlash-----	Loamy-skeletal, mixed Lithic Haploborolls
Williams-----	Fine-loamy, mixed Typic Argiborolls
Winifred-----	Fine, montmorillonitic Typic Haploborolls
Winkler-----	Loamy-skeletal, mixed, frigid Typic Ustochrepts
Work-----	Fine, montmorillonitic Typic Argiborolls
Yamacall-----	Fine-loamy, mixed, frigid Aridic Ustochrepts
Yawdim-----	Clayey, montmorillonitic (calcareous), frigid, shallow Aridic Ustorthents
Yetull-----	Mixed, frigid Typic Ustipsamments
Zahill-----	Fine-loamy, mixed (calcareous), frigid Typic Ustorthents

* Taxadjunct

Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
2	Riverwash-----	2,120	*
2B	Marcott-Bigsandy complex, 0 to 4 percent slopes-----	4,085	0.2
12C	Beaverton complex, 2 to 8 percent slopes-----	1,506	*
13C	Tanna clay loam, 2 to 8 percent slopes-----	916	*
15E	Lambeth silt loam, 8 to 25 percent slopes-----	7,275	0.3
15F	Lambeth silt loam, 25 to 70 percent slopes-----	21,025	0.8
16B	Degrand loam, 0 to 4 percent slopes-----	1,869	*
17B	Delpoint loam, 0 to 4 percent slopes-----	1,347	*
21E	Cabbart-Delpoint loams, 8 to 25 percent slopes-----	3,771	0.1
22F	Hillon loam, 25 to 60 percent slopes-----	44,024	1.7
27B	Attewan loam, 0 to 4 percent slopes-----	3,457	0.1
28	Nishon clay loam, 0 to 1 percent slopes-----	14,650	0.6
30B	Marvan clay, 0 to 4 percent slopes-----	22,124	0.9
30C	Marvan clay, 4 to 8 percent slopes-----	4,545	0.2
31A	Ferd loam, 0 to 2 percent slopes-----	2,632	0.1
32B	Kobase silty clay loam, 0 to 4 percent slopes-----	16,978	0.7
32C	Kobase silty clay loam, 4 to 8 percent slopes-----	7,196	0.3
32D	Kobase silty clay loam, 8 to 15 percent slopes-----	1,376	*
33A	Phillips loam, 0 to 2 percent slopes-----	13,354	0.5
34A	Linnet silty clay, 0 to 2 percent slopes-----	3,802	0.2
35B	Assinniboine fine sandy loam, 0 to 4 percent slopes-----	5,710	0.2
36B	Chinook fine sandy loam, 0 to 4 percent slopes-----	9,341	0.4
36C	Chinook fine sandy loam, 4 to 8 percent slopes-----	3,128	0.1
37B	Evanston loam, 0 to 4 percent slopes-----	60,419	2.4
37C	Evanston loam, 4 to 8 percent slopes-----	7,443	0.3
38B	Ethridge silty clay loam, 0 to 4 percent slopes-----	52,128	2.1
39B	Assinniboine loam, 0 to 4 percent slopes-----	1,822	*
43A	Pendroy clay, 0 to 2 percent slopes-----	5,139	0.2
44B	Kevin clay loam, 0 to 4 percent slopes-----	3,631	0.1
47B	Marias silty clay, 0 to 4 percent slopes-----	22,638	0.9
47C	Marias silty clay, 4 to 8 percent slopes-----	1,078	*
48A	Vanda clay, 0 to 2 percent slopes-----	1,561	*
48C	Vanda clay, 2 to 8 percent slopes-----	1,120	*
50A	Telstad loam, 0 to 2 percent slopes-----	45,985	1.8
55B	Lihen loamy fine sand, 0 to 6 percent slopes-----	2,645	0.1
56A	Scobey clay loam, 0 to 2 percent slopes-----	14,782	0.6
57B	Absarokee clay loam, 0 to 4 percent slopes-----	1,262	*
57C	Absarokee clay loam, 4 to 8 percent slopes-----	660	*
57E	Absarokee-Reeder complex, 8 to 25 percent slopes-----	2,844	0.1
58B	Lonna silty clay loam, 0 to 4 percent slopes-----	6,652	0.3
58C	Lonna silty clay loam, 4 to 8 percent slopes-----	3,668	0.1
60A	Havre loam, 0 to 2 percent slopes-----	8,516	0.3
63	Lardell silty clay, 0 to 1 percent slopes-----	1,180	*
67B	Bearpaw clay loam, 0 to 4 percent slopes-----	38,955	1.5
67C	Bearpaw clay loam, 4 to 8 percent slopes-----	1,701	*
68B	Gerber silty clay, 0 to 4 percent slopes-----	9,253	0.4
69C	Vida-Zahill clay loams, 2 to 8 percent slopes-----	5,924	0.2
71D	Roy very cobbly clay loam, 2 to 15 percent slopes-----	1,081	*
72F	Zahill clay loam, 25 to 60 percent slopes-----	23,758	0.9
73B	Yetull-Lonesome loamy fine sands, 0 to 6 percent slopes-----	2,085	*
74C	Shambo loam, 2 to 8 percent slopes-----	1,956	*
75B	Farnuf loam, 0 to 4 percent slopes-----	6,952	0.3
75C	Farnuf loam, 4 to 8 percent slopes-----	5,640	0.2
76C	Hedoes loam, 2 to 8 percent slopes-----	3,079	0.1
77F	Tinsley gravelly sandy loam, 15 to 45 percent slopes-----	1,881	*
79B	Yamacall loam, 0 to 4 percent slopes-----	5,563	0.2
79C	Yamacall loam, 4 to 8 percent slopes-----	10,074	0.4
79D	Yamacall loam, 8 to 15 percent slopes-----	4,556	0.2
81A	Glendive sandy loam, 0 to 2 percent slopes-----	1,479	*
82B	Savage silty clay loam, 0 to 4 percent slopes-----	12,706	0.5
86B	Work clay loam, 0 to 4 percent slopes-----	2,799	0.1

* See footnote at end of table.

Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Acres	Percent
86C	Work clay loam, 4 to 8 percent slopes-----	7,288	0.3
86D	Work clay loam, 8 to 15 percent slopes-----	1,928	*
87B	Tamaneen clay loam, 0 to 4 percent slopes-----	3,010	0.1
88C	Perma gravelly loam, 2 to 8 percent slopes-----	503	*
90A	Harlake silty clay, 0 to 1 percent slopes-----	2,176	*
92E	Sunburst-Bascovy complex, 8 to 25 percent slopes-----	1,123	*
93F	Yetull fine sandy loam, 15 to 45 percent slopes-----	4,229	0.2
94B	Busby fine sandy loam, 0 to 4 percent slopes-----	1,238	*
94C	Busby fine sandy loam, 4 to 8 percent slopes-----	3,064	0.1
94D	Busby fine sandy loam, 8 to 15 percent slopes-----	1,605	*
96B	Macar loam, 0 to 4 percent slopes-----	1,971	*
96C	Macar loam, 4 to 8 percent slopes-----	2,642	0.1
98B	Kremlin loam, 0 to 4 percent slopes-----	11,063	0.4
98C	Kremlin loam, 4 to 8 percent slopes-----	2,022	*
99	Rivra-Harly complex, 0 to 2 percent slopes-----	2,887	0.1
110C	Laceycreek loam, 2 to 8 percent slopes-----	1,085	*
110D	Laceycreek loam, 8 to 15 percent slopes-----	937	*
110E	Laceycreek loam, 15 to 25 percent slopes-----	893	*
130A	Nesda-McIlwaine complex, 0 to 2 percent slopes-----	3,381	0.1
140A	Klayent clay loam, 0 to 1 percent slopes-----	1,096	*
141B	Megonot-Weingart-Delpoint complex, 0 to 4 percent slopes-----	1,670	*
142C	Megonot-Kobase-Delpoint complex, 2 to 8 percent slopes-----	2,543	0.1
160A	Bigsandy loam, 0 to 1 percent slopes-----	2,828	0.1
171C	Delpoint-Cabbart loams, 2 to 8 percent slopes-----	957	*
180A	McIlwaine-Nesda-Straw complex, 0 to 2 percent slopes-----	1,732	*
182F	Megonot-Yawdim silty clay loams, 25 to 60 percent slopes-----	5,050	0.2
200	Badland-----	22,661	0.9
201F	Cabba-Wayden-Rock outcrop complex, 25 to 70 percent slopes-----	2,474	*
210C	Shane-Gerber complex, 2 to 8 percent slopes-----	822	*
210E	Shane-Barkof-Gerber complex, 8 to 25 percent slopes-----	1,697	*
211F	Cabbart-Yawdim-Rock outcrop complex, 25 to 70 percent slopes-----	50,733	2.0
212F	Cabbart-Hillon loams, 25 to 70 percent slopes-----	18,142	0.7
221E	Hillon-Kevin clay loams, 8 to 25 percent slopes-----	31,502	1.2
222D	Hillon-Delpoint loams, 8 to 25 percent slopes-----	3,811	0.2
223E	Hillon-Fleak complex, 15 to 35 percent slopes-----	4,880	0.2
224E	Hillon-Joplin loams, 8 to 25 percent slopes-----	26,106	1.0
227F	Hillon-Fleak-Rock outcrop complex, 25 to 70 percent slopes-----	1,905	*
229E	Hillon-Lambeth complex, 15 to 35 percent slopes-----	906	*
232A	Acel silty clay loam, 0 to 2 percent slopes-----	4,270	0.2
251C	Bascovy-Neldore silty clays, 2 to 8 percent slopes-----	2,661	0.1
251E	Bascovy-Neldore silty clays, 8 to 25 percent slopes-----	22,467	0.9
252C	Bascovy-Marvan silty clays, 2 to 8 percent slopes-----	6,332	0.2
261B	Absher-Nobe complex, 0 to 4 percent slopes-----	2,466	*
263A	Toston clay loam, 0 to 1 percent slopes-----	4,359	0.2
264A	Toston-Nobe complex, 0 to 1 percent slopes-----	2,158	*
265B	Absher-Gerdrum complex, 0 to 4 percent slopes-----	1,002	*
272C	Attewan-Tinsley complex, 2 to 8 percent slopes-----	5,603	0.2
301A	Marvan-Vanda clays, 0 to 2 percent slopes-----	1,799	*
301C	Marvan-Vanda clays, 2 to 8 percent slopes-----	10,907	0.4
303A	Flatcreek-Nobe silty clays, 0 to 2 percent slopes-----	3,753	0.1
305A	Marvan-Nobe clays, 0 to 2 percent slopes-----	1,302	*
311B	Ferd-Creed-Gerdrum complex, 0 to 4 percent slopes-----	19,221	0.8
311C	Ferd-Creed-Gerdrum complex, 4 to 8 percent slopes-----	3,190	0.1
323B	Sagedale silty clay loam, 0 to 4 percent slopes-----	6,099	0.2
323C	Sagedale silty clay loam, 4 to 8 percent slopes-----	4,998	0.2
324B	Marcott silty clay loam, 0 to 3 percent slopes-----	1,684	*
331B	Phillips-Elloam complex, 0 to 4 percent slopes-----	50,219	2.0
331C	Phillips-Elloam complex, 4 to 8 percent slopes-----	7,260	0.3
334B	Phillips-Kevin complex, 0 to 4 percent slopes-----	4,837	0.2
341B	Linnet-Marias silty clays, 0 to 4 percent slopes-----	3,727	0.1
351B	Kenilworth-Fortbenton fine sandy loams, 0 to 3 percent slopes-----	16,829	0.7

*See footnote at end of table.

Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Acres	Percent
361B	Fortbenton fine sandy loam, 0 to 4 percent slopes-----	29,039	1.1
362C	Chinook-Yetull complex, 2 to 10 percent slopes-----	5,798	0.2
363B	Cozberg-Chinook fine sandy loams, 0 to 4 percent slopes-----	2,069	*
363C	Chinook-Lihen fine sandy loams, 2 to 10 percent slopes-----	5,389	0.2
364B	Chinook loam, 0 to 4 percent slopes-----	2,156	*
364C	Chinook loam, 4 to 8 percent slopes-----	852	*
365B	Fortbenton-Chinook fine sandy loams, 0 to 6 percent slopes-----	8,065	0.3
368C	Fortbenton-Hillon complex, 2 to 8 percent slopes-----	5,339	0.2
372C	Evanston-Yamacall loams, 2 to 8 percent slopes-----	1,973	*
375B	Evanston-Lonna loams, 0 to 4 percent slopes-----	4,796	0.2
377B	Evanston-Degrad loams, 0 to 4 percent slopes-----	1,550	*
381B	Ethridge clay loam, 0 to 4 percent slopes-----	3,877	0.2
385B	Ethridge-Kobase silty clay loams, 0 to 4 percent slopes-----	31,719	1.2
386B	Ethridge-Evanston complex, 0 to 4 percent slopes-----	1,575	*
388A	Ethridge-Lonna silty clay loams, 0 to 2 percent slopes-----	14,557	0.6
402A	Gerdum-Absher-Creed complex, 0 to 2 percent slopes-----	9,109	0.4
410	Rock outcrop-Fleak complex, 25 to 70 percent slopes-----	1,396	*
411D	Farnuf-Reeder loams, 4 to 15 percent slopes-----	3,782	0.1
411E	Reeder-Farnuf loams, 8 to 25 percent slopes-----	9,993	0.4
421C	Joplin-Hillon loams, 2 to 8 percent slopes-----	30,763	1.2
422C	Marmarth loam, 2 to 8 percent slopes-----	2,034	*
441C	Kevin-Hillon clay loams, 2 to 8 percent slopes-----	38,269	1.5
442C	Kevin-Elloam clay loams, 2 to 8 percent slopes-----	7,130	0.3
444D	Kevin-Scobey clay loams, 8 to 15 percent slopes-----	3,786	0.1
451C	Turner-Beaverton complex, 2 to 8 percent slopes-----	1,383	*
460	Laceycreek loam, 8 to 25 percent slopes, moist-----	3,365	0.1
471B	Marias-Kobase complex, 0 to 4 percent slopes-----	14,353	0.6
481A	Bigsag silty clay, 0 to 2 percent slopes-----	4,417	0.2
493A	Enbar-Straw-Eagleton loams, 0 to 2 percent slopes-----	3,613	0.1
503B	Telstad-Joplin loams, 0 to 4 percent slopes-----	187,597	7.4
503C	Telstad-Joplin loams, 4 to 8 percent slopes-----	67,827	2.7
510	Rock outcrop-Belain complex, 15 to 45 percent slopes-----	2,107	*
511A	Martinsdale-Turner loams, 0 to 2 percent slopes-----	1,835	*
511C	Martinsdale loam, 2 to 8 percent slopes-----	1,623	*
512C	Martinsdale stony loam, 4 to 15 percent slopes-----	1,313	*
521B	Thoeny-Elloam-Absher complex, 0 to 4 percent slopes-----	7,630	0.3
530F	Warwood loam, 15 to 45 percent slopes-----	681	*
531A	Sweetgrass-Beaverton complex, 0 to 2 percent slopes-----	5,409	0.2
531C	Sweetgrass-Beaverton complex, 2 to 8 percent slopes-----	3,747	0.1
550F	Libeg-Arrowpeak-Elkner complex, 25 to 70 percent slopes-----	13,091	0.5
551B	Lonesome loamy fine sand, 0 to 6 percent slopes-----	1,744	*
560F	Elve-Rock outcrop complex, 25 to 70 percent slopes-----	1,438	*
561B	Scobey-Kevin clay loams, 0 to 4 percent slopes-----	174,784	6.9
561C	Scobey-Kevin clay loams, 4 to 8 percent slopes-----	68,709	2.7
562B	Scobey-Linnet complex, 0 to 4 percent slopes-----	17,169	0.7
563A	Fortbenton-Scobey fine sandy loams, 0 to 3 percent slopes-----	9,399	0.4
580F	Garlet-Elkner complex, 25 to 70 percent slopes-----	11,083	0.4
601A	Havre-Glendive complex, 0 to 1 percent slopes-----	2,171	*
602A	Havre silty clay loam, 0 to 1 percent slopes-----	3,808	0.2
603A	Havre-Glendive complex, 0 to 2 percent slopes, occasionally flooded-----	13,928	0.6
605C	Yamacall-Havre loams, 0 to 8 percent slopes-----	22,322	0.9
621E	Sagedale-Wayden silty clay loams, 8 to 25 percent slopes-----	6,689	0.3
621F	Wayden-Sagedale silty clay loams, 25 to 60 percent slopes-----	13,757	0.5
623F	Linwell-Winifred clay loams, 15 to 45 percent slopes-----	9,432	0.4
630E	Crow-Lubrecht loams, 8 to 35 percent slopes-----	1,215	*
641F	Norbert-Barkof silty clays, 25 to 60 percent slopes-----	4,108	0.2
650D	Laceycreek-Ambrant complex, 4 to 15 percent slopes-----	298	*
650F	Laceycreek-Eaglecreek loams, 15 to 45 percent slopes-----	1,653	*
653F	Fleak-Twilight-Yetull complex, 25 to 70 percent slopes-----	4,918	0.2
654F	Fleak-Twilight-Rock outcrop complex, 25 to 70 percent slopes-----	6,130	0.2
661E	Twilight-Fleak complex, 8 to 25 percent slopes-----	7,427	0.3

* See footnote at end of table.

Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Acres	Percent
671B	Bearpaw-Vida clay loams, 0 to 4 percent slopes-----	144,043	5.7
671C	Bearpaw-Vida clay loams, 4 to 8 percent slopes-----	66,411	2.6
673A	Bearpaw-Daglum complex, 0 to 2 percent slopes-----	1,003	*
674B	Bearpaw-Waltham clay loams, 0 to 4 percent slopes-----	5,886	0.2
680F	Winkler-Ambrant complex, 25 to 60 percent slopes-----	4,796	0.2
681C	Gerber clay, 4 to 8 percent slopes-----	994	*
691D	Vida-Williams loams, 8 to 15 percent slopes-----	2,575	0.1
692D	Vida-Bearpaw clay loams, 4 to 15 percent slopes-----	11,226	0.4
693C	Vida-Bearpaw-Nishon clay loams, 0 to 15 percent slopes-----	5,105	0.2
701E	Work-Absarokee clay loams, 8 to 25 percent slopes-----	8,721	0.3
702E	Work-Absarokee stony loams, 8 to 35 percent slopes-----	6,367	0.2
721E	Zahill-Vida clay loams, 8 to 25 percent slopes-----	23,497	0.9
722F	Zahill-Sagedale-Wayden complex, 15 to 45 percent slopes-----	5,118	0.2
723F	Zahill-Cabba complex, 15 to 45 percent slopes-----	4,987	0.2
731F	Yetull-Dune land complex, 15 to 45 percent slopes-----	299	*
741B	Shambo-Straw loams, 0 to 4 percent slopes-----	3,710	0.1
745F	Shambo-Amor-Cabba loams, 15 to 45 percent slopes-----	12,545	0.5
761C	Hedoes-Belain loams, 2 to 8 percent slopes-----	651	*
761E	Hedoes-Belain loams, 8 to 25 percent slopes-----	7,764	0.3
793B	Yamacall clay loam, 0 to 4 percent slopes-----	4,120	0.2
793C	Yamacall clay loam, 4 to 8 percent slopes-----	1,740	*
795C	Yamacall-Benz clay loams, 2 to 8 percent slopes-----	2,667	0.1
795D	Yamacall-Benz clay loams, 8 to 15 percent slopes-----	1,111	*
801B	Williams-Vida loams, 0 to 4 percent slopes-----	4,776	0.2
801C	Williams-Vida loams, 4 to 8 percent slopes-----	6,054	0.2
828A	Savage loam, 0 to 2 percent slopes-----	1,095	*
842A	Savage-Daglum complex, 0 to 2 percent slopes-----	1,869	*
863E	Work-Roy complex, 8 to 25 percent slopes-----	3,989	0.2
871B	Tamaneen cobbly clay loam, 0 to 4 percent slopes-----	2,017	*
871C	Tamaneen cobbly clay loam, 4 to 8 percent slopes-----	502	*
883F	Perma-Whitlash complex, 25 to 70 percent slopes-----	18,668	0.7
892F	Whitlash-Belain-Rock outcrop complex, 25 to 60 percent slopes-----	2,334	*
895F	Belain-Whitlash, moist-Hedoes complex, 15 to 60 percent slopes-----	18,124	0.7
896E	Belain-Whitlash-Rock outcrop complex, 8 to 25 percent slopes-----	1,091	*
911F	Belain-Whitlash-Hedoes complex, 15 to 45 percent slopes-----	34,432	1.4
916C	Belain-Hedoes sandy loams, 2 to 8 percent slopes-----	1,228	*
925F	Sunburst-Lambeth complex, 25 to 70 percent slopes-----	17,765	0.7
941D	Busby-Twilight fine sandy loams, 4 to 15 percent slopes-----	3,895	0.2
943C	Tally fine sandy loam, 2 to 8 percent slopes-----	1,956	*
943E	Tally-Vebar fine sandy loams, 8 to 25 percent slopes-----	3,757	0.1
943F	Tally-Cohagen fine sandy loams, 25 to 60 percent slopes-----	3,506	0.1
965F	Cabba-Macar loams, 15 to 60 percent slopes-----	10,922	0.4
971F	Neldore-Bascovy silty clays, 25 to 60 percent slopes-----	48,125	1.9
972F	Neldore-Rock outcrop complex, 25 to 70 percent slopes-----	31,926	1.3
974F	Neldore-Hillon complex, 25 to 70 percent slopes-----	33,087	1.3
DA	Denied access-----	4,800	0.2
M-W	Miscellaneous Water-----	30	*
W	Water-----	15,060	0.6
	Total-----	2,526,082	100.0

* Less than 0.1 percent.

Agronomy

General management needed for crops and for hay and pasture is suggested in this section. The system of land capability classification used by the Natural Resources Conservation Service is explained, and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider obtaining specific information from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Cropland Limitations and Hazards

The management concerns affecting the use of the detailed map units in the survey area for crops are shown in the table "Main Cropland Limitations and Hazards." The main concerns in managing nonirrigated cropland are conserving moisture, controlling soil blowing and water erosion, and maintaining soil fertility.

Conserving moisture consists primarily of reducing the evaporation and runoff rates and increasing the water intake rate. Applying conservation tillage and conservation cropping systems, farming on the contour, stripcropping, establishing field windbreaks, and leaving crop residue on the surface conserve moisture.

Generally, a combination of several practices is needed to control *soil blowing* and *water erosion*. Conservation tillage, stripcropping, field windbreaks, tall grass barriers, contour farming, conservation cropping systems, crop residue management, diversions, and grassed waterways help to prevent excessive soil loss.

Measures that are effective in maintaining *soil fertility* include applying fertilizer, both organic and inorganic, including manure; incorporating crop residue or green manure crops into the soil; and using proper crop rotations. Controlling erosion helps to prevent the loss of organic matter and plant nutrients and thus helps to maintain productivity, although the level of fertility can be reduced even in areas where erosion is controlled. All soils used for nonirrigated crops respond well to applications of fertilizer.

Some of the limitations and hazards shown in the table cannot be easily overcome. These are *channels*, *flooding*, *depth to rock*, *ponding*, *gullies*, and *lack of timely precipitation*.

Additional limitations and hazards are as follows:

Areas of rock outcrop and slick spots.—Farming around these areas may be feasible. Subsoiling or deep ripping soft sedimentary beds increases the effective rooting depth and the rate of water infiltration.

Excessive permeability.—This limitation causes deep leaching of nutrients and pesticides. The capacity of the soil to retain moisture for plant use is poor.

Potential for ground-water pollution.—This is a hazard in soils with excessive permeability, hard bedrock, or a water table within the profile.

Lime content, limited available water capacity, poor tilth, restricted permeability, and surface crusting.—These limitations can be overcome by incorporating green manure crops, manure, or crop residue into the soil; applying a system of conservation tillage; and using conservation cropping systems. Also, crops may respond well to additions of phosphate fertilizer to soils that have a high content of lime.

Short frost-free season.—If the growing season is less than 90 days, short-season crops or grasses should be grown.

Surface rock fragments.—This limitation causes rapid wear of tillage equipment. It cannot be easily overcome.

Slope.—Where the slope is more than 8 percent, water erosion and soil blowing may be accelerated unless conservation farming practices are applied.

Surface stones.—Stones or boulders on the surface can hinder normal tillage unless they are removed.

Salt and sodium content.—In areas where this is a limitation, only salt- and sodium-tolerant crops should be grown.

On irrigated soils the main management concerns are *efficient water use*, *nutrient management*, *control of erosion*, *pest and weed control*, and *timely planting and harvesting* for a successful crop. An irrigation system that provides optimum control and distribution of water at minimum cost is needed. Overirrigation wastes water, leaches plant nutrients, and causes erosion.

Also, it can create drainage problems, raise the water table, and increase soil salinity.

Following is an explanation of the criteria used to determine the limitations or hazards.

Areas of rock outcrop.—Rock outcrop is a named component of the map unit.

Areas of rubble land.—Rubble land is a named component of the map unit.

Areas of slick spots.—Slick spots are a named component of the map unit.

Channeled.—The word “channeled” is included in the name of the map unit.

Depth to rock.—Bedrock is within a depth of 40 inches.

Erosion by water.—The surface K factor multiplied by the upper slope limit is more than 2 (same as prime farmland criteria).

Excessive permeability.—The upper limit of the permeability range is 6 inches or more within the soil profile.

Flooding.—The component of the map unit is occasionally flooded or frequently flooded.

Gullied.—The word “gullied” is included in the name of the map unit.

Lack of timely precipitation.—The component of the map unit has a Xeric moisture regime. The amount of annual precipitation is no more than 14 inches.

Lime content.—The component is assigned to wind erodibility group 4L or has more than 5 percent lime in the upper 10 inches.

Limited available water capacity.—The available water capacity calculated to a depth of 60 inches or to a root-limiting layer is 5 inches or less.

Ponding.—Ponding duration is assigned to the component of the map unit.

Potential for ground-water pollution.—The soil has a water table within a depth of 4 feet or hard bedrock within the profile, or permeability is more than 6 inches per hour within the soil.

Poor tilth.—The component of the map unit has more than 35 percent clay in the surface layer.

Restricted permeability.—Permeability is 0.06 inch per hour or less within the soil profile.

Salt content.—The component of the map unit has an electrical conductivity of more than 4 in the surface layer or more than 8 within a depth of 30 inches.

Short frost-free season.—The map unit has a growing season of less than 90 frost-free days.

Slope.—The upper slope range of the component of the map unit is more than 8 percent.

Sodium content.—The sodium adsorption ratio of the component of the map unit is more than 13 within a depth of 30 inches.

Soil blowing.—The wind erodibility index multiplied by the selected high C factor for the survey area and then divided by the T factor is more than 8 for the component of the map unit.

Surface rock fragments.—The terms describing the texture of the surface layer include any rock fragment modifier except for gravelly or channery, and “surface stones” is not already indicated as a limitation.

Surface crusting.—The sodium adsorption ratio in the surface layer is 5 or more for any texture and 4 or more if the texture is silt, silt loam, loam, or very fine sandy loam.

Surface stones.—The terms describing the texture of the surface layer include any stony or bouldery modifier, or the soil is a stony or bouldery phase.

Water table.—The component of the map unit has a water table within a depth of 60 inches.

Crop Yield Estimates

The average yields per acre that can be expected of the principal crops under a high level of management are shown in the table “Land Capability and Yields per Acre of Crops.” In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss. Yields for dryland crops are based on a crop-fallow system.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good-quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are

likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in the table are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops

Pasture and Hayland Interpretations

Under good management, proper grazing is essential for the production of high-quality forage, stand survival, and erosion control. Proper grazing helps plants to maintain sufficient and generally vigorous top growth during the growing season. Brush control is essential in many areas, and weed control generally is needed. Rotation grazing and renovation also are important management practices.

Yield estimates are often provided in animal unit months (AUM), or the amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about forage yields other than those shown in the table "Land Capability and Yields per Acre of Crops."

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, as described in "Land Capability Classification" (USDA-SCS, 1961), soils

generally are grouped at three levels: capability class, subclass, and unit. These levels indicate the degree and kinds of limitations affecting mechanized farming systems that produce the more commonly grown field crops, such as corn, small grain, cotton, hay, and field-grown vegetables. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by numerals 1 through 8. The numerals indicate progressively greater limitations and narrower choices for practical use.

If properly managed, soils in classes 1, 2, 3, and 4 are suitable for the mechanized production of commonly grown field crops and for pasture and woodland. The degree of the soil limitations affecting the production of cultivated crops increases progressively from class 1 to class 5. The limitations can affect levels of production and the risk of permanent soil deterioration caused by erosion and other factors.

Soils in classes 5, 6, and 7 are generally not suited to the mechanized production of commonly grown field crops without special management, but they are suitable for plants that provide a permanent cover, such as grasses and trees. The severity of the soil limitations affecting crops increases progressively from class 5 to class 7. The local office of the Cooperative Extension Service or the Natural Resources Conservation Service can provide guidance on the use of these soils as cropland.

Areas in class 8 are generally not suitable for crops, pasture, or woodland without a level of management that is impractical. These areas may have potential for other uses, such as recreational facilities and wildlife habitat.

Capability subclasses indicate the dominant limitations in the class. They are designated by adding a small letter, "e, w, s," or "c," to the class numeral, for example, 2e. The letter "e" shows that the main hazard is the risk of erosion unless a close-growing plant cover is maintained; "w" shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); "s" shows that the soil is limited mainly because it is shallow, droughty, or stony; and "c," used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

There are no subclasses in class 1 because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by "w, s," or "c" because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their

use mainly to pasture, rangeland, woodland, wildlife habitat, or recreation.

The capability classification of each map unit is given in the table "Land Capability and Yields per Acre of Crops" at the end of this section.

Prime Farmland and Other Important Farmland

In this section, prime farmland and other important farmland are defined. The soils in the survey area that are considered prime farmland are listed in the table "Prime Farmland" at the end of this section.

Prime Farmland

Prime farmland is of major importance in meeting the Nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, State, and Federal levels, as well as individuals, must encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to food, seed, forage, fiber, and oilseed crops. Such soils have properties that favor the economic production of sustained high yields of crops. The soils need only to be treated and managed by acceptable farming methods. An adequate moisture supply and a sufficiently long growing season are required. Prime farmland soils produce the highest yields with minimal expenditure of energy and economic resources, and farming these soils results in the least damage to the environment.

Prime farmland soils may presently be used as cropland, pasture, or woodland or for other purposes. They either are used for food and fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water-control structures. Public land is land not available for farming in National forests, National parks, military reservations, and State parks.

Prime farmland soils commonly receive an adequate and dependable supply of moisture from precipitation

or irrigation. The temperature and growing season are favorable, and the level of acidity or alkalinity and the content of salts and sodium are acceptable. The soils have few, if any, rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods, and they are not frequently flooded during the growing season or are protected from flooding. Slopes range mainly from 0 to 6 percent.

Soils that have a high water table, are subject to flooding, or are droughty may qualify as prime farmland where these limitations are overcome by drainage measures, flood control, or irrigation. Onsite evaluation is necessary to determine the effectiveness of corrective measures. More information about the criteria for prime farmland can be obtained at the local office of the Natural Resources Conservation Service.

A recent trend in land use has been the conversion of prime farmland to urban and industrial uses. The loss of prime farmland to other uses puts pressure on lands that are less productive than prime farmland.

The map units in the survey area that meet the requirements for prime farmland are listed in the table "Prime Farmland." On some soils included in the table, measures that overcome limitations are needed. The need for these measures is indicated in parentheses after the map unit name. The location of each map unit is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described in the section "Soil Series and Detailed Map Units." This list does not constitute a recommendation for a particular land use.

Unique Farmland

Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops. It has the special combination of soil qualities, location, growing season, and moisture supply needed for the economic production of sustained high yields of a specific high-quality crop when treated and managed by acceptable farming methods. Examples of such crops are citrus, tree nuts, olives, cranberries, and vegetables.

Unique farmland is used for a specific high-value food or fiber crop; has an adequate supply of available moisture for the specific crop because of stored moisture, precipitation, or irrigation; and has a combination of soil qualities, growing season, temperature, humidity, air drainage, elevation, aspect, and other factors, such as nearness to markets, that favors the production of a specific food or fiber crop.

Lists of unique farmland are developed as needed in cooperation with conservation districts and others.

Additional Farmland of Statewide Importance

Some areas other than areas of prime and unique farmland are of statewide importance in the production of food, feed, fiber, forage, and oilseed crops. The criteria used in defining and delineating these areas are determined by the appropriate State agency or agencies. Generally, additional farmland of statewide importance includes areas that nearly meet the criteria for prime farmland and that economically produce high yields of crops when treated and managed by acceptable farming methods. Some areas can produce as high a yield as areas of prime farmland if conditions are favorable. In some states additional farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

A list of this land has not been maintained for Montana and thus is not presently available.

Additional Farmland of Local Importance

This land consists of areas that are of local importance in the production of food, feed, fiber, forage, and oilseed crops and are not identified as having national or statewide importance. Where appropriate, this land is identified by local agencies. It may include tracts of land that have been designated for agriculture by local ordinance.

Lists of this land are developed as needed in cooperation with conservation districts and others.

Erosion Factors

Soil erodibility (K) and soil-loss tolerance (T) factors are used in an equation that predicts the amount of soil lost through water erosion in areas of cropland. The procedure for predicting soil loss is useful in guiding the selection of soil and water conservation practices.

Soil Erodibility (K) Factor

The soil erodibility factor (K) indicates the susceptibility of a soil to sheet and rill erosion by water. The soil properties that influence erodibility are those that affect the infiltration rate, the movement of water through the soil, and the water storage capacity of the

soil and those that allow the soil to resist dispersion, splashing, abrasion, and the transporting forces of rainfall and runoff. The most important soil properties are the content of silt plus very fine sand, the content of sand coarser than very fine sand, the content of organic matter, soil structure, and permeability.

Fragment-Free Soil Erodibility (Kf) Factor

This is one of the factors used in the revised Universal Soil Loss Equation. It shows the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Soil-Loss Tolerance (T) Factor

The soil-loss tolerance factor (T) is an estimate of the maximum annual rate of soil erosion that can occur over a sustained period without affecting crop productivity. The rate is expressed in tons of soil loss per acre per year. Ratings of 1 to 5 are used, depending on soil properties and prior erosion. The criteria used in assigning a T factor to a soil include maintenance of an adequate rooting depth for crop production, potential reduction of crop yields, maintenance of water-control structures affected by sedimentation, prevention of gully erosion, and the value of nutrients lost through erosion.

Wind Erodibility Groups

Wind erodibility is directly related to the percentage of dry, nonerodible surface soil aggregates larger than 0.84 millimeter in diameter. From this percentage, the wind erodibility index factor (I) is determined. This factor is an expression of the stability of the soil aggregates, or the extent to which they are broken down by tillage and the abrasion caused by windblown soil particles. Soils are assigned to wind erodibility groups (WEG) having similar percentages of dry soil aggregates larger than 0.84 millimeter.

Additional information about wind erodibility groups and K, Kf, T, and I factors can be obtained from local offices of the Natural Resources Conservation Service or the Cooperative Extension Service.

Crops and Pasture of the Chouteau County Area

About 52 percent of the survey area is cropland. There are about 1,285,000 acres of dryland farming

and 15,000 acres of irrigated land. Dryland farming is discussed below.

The two main dryland crops are wheat and barley. Winter wheat is the predominant wheat crop. However, some spring wheat is seeded each year. Other crops seeded include malting barley, alfalfa hay, grass for hay and pasture, grass for seed, durum wheat, triticale, oats, safflower, sunflowers, canary seed, corn for silage, and potatoes.

The main considerations in managing nonirrigated cropland are conserving moisture, reducing soil blowing and water erosion, and controlling soil salinity or saline seep. Each is explained in the following paragraphs.

Conserving soil moisture. Much of the survey area does not receive enough annual precipitation to produce a profitable crop every year. A small grain and fallow rotation is commonly used to assure a successful crop. In this rotation, the soil moisture accumulated after harvest to the previous crop and during the fallow period is critical to the yield of the next crop. Each additional inch of stored soil moisture helps to produce an estimated 4 or 5 bushels of wheat or 5 to 7 bushels of barley.

Some soils are not capable of storing all of the moisture received from snow and rainfall before the next crop in a small grain-fallow system. Sandy soils and shallow soils are in this category. Water is lost by deep percolation below the crop root zone, or by runoff, where the infiltration rate of precipitation is slow. These soils are sometimes cropped every year since accumulated moisture from summer fallow is lost to the crop.

Management practices that help conserve moisture include good weed control, leaving the stubble stand over the first winter after harvest, reducing tillage operations, leaving 30 percent or more of the residue on the surface during the fallow year, and planting moisture efficient crops and varieties. Barley is generally more efficient than spring wheat. Semidwarf varieties of spring wheat are generally more efficient than tall varieties in terms of their ability to convert soil moisture into bushels of grain.

Where enough soil moisture is accumulated after harvest and over the winter, recropping may be more profitable than the traditional crop-fallow system. Though the science is not exact, 2 feet of moist soil, by probing in medium to heavy textured soils, is considered enough to produce an adequate crop in most years. This is equal to 3.5 to 4.5 inches of stored soil moisture available to plants. Growing season precipitation is expected to be normal or near normal for a successful crop. Additional fertilizer is needed to recrop, as most of the nutrients normally released from

the crop residue breakdown in a crop-fallow system is still contained in the residue.

Reducing soil blowing. Soil blowing is a problem on most cultivated soils in a crop-fallow rotation. Most soil blowing takes place after the fallow season from November through May. It is a special problem early in the spring when there are persistent strong winds. Unless well managed, sandy and clayey soils are readily eroded during this period. Loamy soils can also erode if they are cultivated in wide strips or in blocks during dry periods when the wind velocity is high.

Loss of the surface layer through soil blowing affects soil productivity, soil tilth, available water holding capacity, rooting depth, and the sediment load in streams. In addition, it often affects crop yields indirectly by removing or displacing chemical fertilizers and pesticides. It contributes to chemical pollution of surface waters.

Management practices that help reduce soil blowing include grasses and legumes in the rotation, alternating strips of crop and fallow, recropping when feasible, maintaining crop residues on the soil surface with mulch or reduced tillage, using low-crown shovels and sweeps, reducing tillage speeds, maintaining a cloddy or ridged surface, and planting wind barriers such as trees or tall wheatgrass rows.

The primary methods used are to combine the proper width of wind strips and maintain adequate crop residues on the soil surface. The amount of crop residue needed for good protection varies with the soil, topography, size of the field, and the climate. There are enough differences in precipitation and wind velocity within the survey area to cause significantly different erosion hazards from area to area. For specific information of climatic factors and erosion hazards contact the local office of the Natural Resources Conservation Service.

Reducing erosion by water. Runoff causes erosion on most of the cropland with slopes of 2 percent or more. However, the majority of erosion by water takes place on cropland with slopes of 8 percent or more. The factors that contribute to erosion by water are percent slope, slope length, soil type, crop and residue management, and climate. The survey area is also influenced significantly by Chinook Winds which cause snow melt, runoff occurs very quickly and increases the erosion hazard. Of these factors, only slope length and crop/residue management can be changed by the operator.

A practice that can reduce slope length is a diversion ditch. It can be used to divert runoff water from uphill areas, usually steep grassed or rocky areas. The water is carried away from cropland to

grassed areas or to grassed waterways in the field in order to prevent gullying. Diversion ditches are not common in the survey area due to the expense of construction and the maintenance required.

A grassed waterway is an excellent method to carry runoff water through a cropped field and avoid gullying. Farm equipment must be raised when crossing the waterway. The only maintenance required is mowing or harvesting the grass in order to prevent deep snowpacks from forming in the waterway. Rapid melting of deep snowpacks can cause gullying even within a grassed waterway.

Practices that are commonly used to reduce water erosion are related to crop and residue management. On livestock farms, good hay and pasture crops in rotation with small grains help reduce soil loss to an acceptable level. On grain farms, practices include cross-slope farming, field stripcropping with grass buffer strips, contour stripcropping, and maintaining crop residues on the soil surface. Leaving crop residues on the surface helps to reduce erosion by protecting the soil from raindrop splash and reducing overland transport of soil. Crop residues also increase water infiltration into the soil before it begins to run off.

Controlling saline seep. Saline seeps result when excess water moves through the soil, commonly a soil formed in glacial till, and collects on top of impermeable underlying shale or bedrock. The problem of excess water occurs mainly in areas of crop-fallow dryland farming. During fallow periods more water is stored in the soil than can be used by the crop. The excess water then percolates below the root zone of the crop and dissolves salts in the soil or parent material below. When it reaches the impermeable layer below it begins to move laterally and downslope, accumulating more salts and resurfacing to form saline seeps. They are commonly too wet to farm across and time consuming to farm around. Those that can be farmed are generally nonproductive. Once formed, saline seeps may increase in size at the rate of 5 to 10 percent per year.

The most effective solution to the saline seep problem on nonirrigated cropland is to use the water where it falls. This can be done by recropping or by establishing grasses and legumes in the recharge area. The recharge area is the area of excess water accumulation and is usually at least ten times the size of the existing seep itself.

Early detection of potential saline seep areas is needed so that the problem can be corrected. New or developing wet spots, areas of late maturing crops, or the prolific growth of foxtail barley or kochia indicate

areas that should be examined by soil probing and soil sampling for soil salinity. Identified seep areas may be complex with more than one recharge area involved. These should be investigated with a drill rig, placing several shallow wells in the suspected recharge areas to determine the direction of water flow into the seep area. More specific information can be obtained by contacting the local Natural Resources Conservation Service or the Montana Salinity Control Association.

Approximately 15,000 acres of cropland are irrigated in the survey area. The irrigated land is primarily used for feed barley, spring wheat, hayland and pasture, and a limited amount of corn and potato production. The most common needs in managing irrigated soils are practices for efficient water use, controlling erosion, and maintaining productivity and soil tilth.

Water supplies along Highwood Creek and the Marias, Teton, and Missouri Rivers and are generally good, however, the Teton River often dries up in mid summer. Operations on the benches above the rivers have higher pumping costs because of the extra horse power needed to lift water out of the river valleys. Irrigated acres on the benches along the Marias, Teton, and Missouri Rivers are under sprinklers, and the valley bottoms are surface irrigated by using contour ditches. Water loss from high winds lowers the irrigation efficiency of high pressure sprinkler systems.

The method of applying water to the soil needs to be compatible with soil intake rates, slopes, vegetative cover, volume of water available, and the time required to irrigate. Successful management also depends on knowing the correct time to irrigate and the amount of water to apply. As a general rule, small grain and forage crops should be irrigated when half the available soil moisture has been used. This will depend on the water holding capacity of the soil and crop rooting depth. The objective of irrigation water management is to apply water to the soil in a way to meet the crop needs without excessive water loss through deep percolation or runoff. Deep percolation is not only a water loss and plant nutrient leaching problem, but excess water in the soil can cause saline seeps to form down slope. Some practices that have the potential to increase irrigation efficiency are: irrigation scheduling, low pressure sprinkler systems, low profile center pivots, irrigation land leveling, well designed contour ditch systems, and increased reservoir storage. Contact the local office of the Natural Resources Conservation Service for more detailed information.

Water runoff can cause rill erosion and gully erosion. Excessive volumes in return flow channels can cause

erosion and water quality problems down stream. Erosion is caused by runoff from irrigating too frequently, continuing to apply water after the profile is saturated, and applying volumes that are too large. These runoff and erosion problems are greater as the slope increases. Improperly designed sprinkler systems, especially on low intake soils, can cause ponding and erosion from runoff. Contour ditch irrigation can be suitable on soils with slopes up to 15 percent. Erosion can be a hazard on slopes exceeding 6 percent. Close contour ditch spacings and permanent vegetative cover on slopes greater than 6 percent will reduce erosion potential. If the proper volume of water and set time meets the surface system design, runoff and erosion are minimized.

Continuous small grain production and removing crop residue through baling or burning can cause a deficiency of nitrogen and phosphorus. Nitrogen is also lost through excessive irrigation water use. Fertilization is necessary for high crop yields on irrigated soils. Including legumes in the cropping system will help soil tilth and correct part of the nitrogen deficiency. Mineral fertilizers can be applied according to soil tests to provide required nitrogen and phosphorus levels. When feasible, all crop residue should be returned to the soil. Residue will return some nutrients to the soil, increase organic matter, improve soil structure, and increase the water intake of most soils.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, help to keep snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Windbreaks are often planted on land that did not originally support trees. Knowledge of how trees perform on such land can be gained only by observing

and recording the performance of trees that have been planted and have survived. Many popular windbreak species are not indigenous to the areas in which they are planted.

Each tree or shrub species has certain climatic and physiographic limits. Within these parameters, a tree or shrub may grow well or grow poorly, depending on the characteristics of the soil. Each tree or shrub has definable potential heights in a given physiographic area and under a given climate. Accurate definitions of potential heights are necessary when a windbreak is planned and designed.

The table "Windbreaks and Environmental Plantings" shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in this table are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Natural Resources Conservation Service or the Cooperative Extension Service or from a nursery.

Windbreak Suitability Groups

Windbreak suitability groups consist of soils in which the kinds and degrees of the hazards and limitations that affect the survival and growth of trees and shrubs in windbreaks are about the same.

Group 1 consists of soils that have no soil-related hazards or limitations or only slight hazards or limitations if they are used for windbreaks. Slopes are less than 15 percent.

Group 2M consists of soils that have a moderate available water capacity (5 to 10 inches) because of texture, depth, or both. The soils are well drained and are not affected by salinity. A layer of concentrated lime, if it occurs, is below a depth of 24 inches. Slopes are less than 15 percent.

Group 2L consists of soils that have a layer of concentrated lime (more than 15 percent calcium carbonate equivalent) at a depth of about 15 to 24 inches. The available water capacity is at least 5 inches. The soils are well drained and are not affected by salinity or alkalinity (the electrical conductivity is less than 4 millimhos per centimeter). Slopes are less than 15 percent.

Group 2W consists of soils that have an available water capacity of 5 inches or more. If the soils have a layer of concentrated lime, the layer is below a depth

of 15 inches. The depth to a permanent water table is 30 to 60 inches. The soils are not affected by salinity. Slopes are less than 15 percent.

Group 2S consists of soils that are moderately affected by salinity (the electrical conductivity is 4 to 12 millimhos per centimeter). The available water capacity is at least 5 inches. A layer of concentrated lime, if it occurs, is at a depth of 15 inches or more. The water table is at a depth of 30 inches or more. Slopes are less than 15 percent.

Group 3M consists of soils that have an available water capacity of 2 to 5 inches because of texture, depth, or both. A layer of concentrated lime, if it occurs, is at a depth of 15 inches or more. The soils are well drained and are not affected by salinity (the electrical conductivity is less than 4 millimhos per centimeter).

Group 3L consists of soils that have a layer of concentrated lime (more than 15 percent calcium carbonate equivalent) at a depth of less than 15 inches. A permanent water table is at a depth of more than 30 inches. The available water capacity is more than 5 inches. The soils are not affected by salinity (the electrical conductivity is less than 4 millimhos per centimeter). Slopes are less than 15 percent.

Group 3W consists of soils that have an available water capacity of 2 inches or more. If the soils have a layer of concentrated lime, the layer is below a depth of 15 inches. The depth to a permanent water table is 30 inches or less. It is more than 10 inches during all or most of the growing season. The soils are not affected by salinity. Slopes are less than 15 percent.

Group 3S consists of soils that are severely affected by salinity or alkalinity (the electrical conductivity is 12 to 16 millimhos per centimeter). The available water capacity is 5 inches or more. A layer of concentrated lime, if it occurs, is at a depth of more than 15 inches. A permanent water table is at a depth of 30 inches or more. Slopes are less than 15 percent.

Group 4 consists of soils that have slopes of more than 15 percent, except for those in areas where the length of the slopes is 100 feet or less, and the less sloping soils that have very severe limitations, including soils that have a very low available water capacity (2 inches or less); very shallow, stony, or gravelly soils; strongly saline and alkali soils, in which the electrical conductivity is more than 16 millimhos per centimeter; and soils that have a pH of more than 9.0. Rock outcrop also is in this group.

Main Cropland Limitations and Hazards

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
2: Riverwash-----	Nonsoil material
2B: Marcott-----	Poor tilth Potential for ground-water pollution Salt content Soil blowing Water table
Big sandy-----	Flooding Lime content Limited available water capacity Potential for ground-water pollution Salt content Soil blowing Surface crusting Water table
12C: Beaverton-----	Excessive permeability Limited available water capacity Potential for ground-water pollution Soil blowing Surface rock fragments
Beaverton-----	Excessive permeability Limited available water capacity Potential for ground-water pollution Soil blowing
13C: Tanna-----	Depth to rock Erosion by water Lime content Limited available water capacity Soil blowing
15E: Lambeth-----	Erosion by water Lime content Slope Soil blowing
15F: Lambeth-----	Erosion by water Lime content Slope Soil blowing
16B: Degrand-----	Excessive permeability Potential for ground-water pollution Soil blowing
17B: Delpoint-----	Depth to rock Lime content Limited available water capacity Soil blowing

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
21E: Cabbart-----	Depth to rock Erosion by water Lime content Limited available water capacity Slope Soil blowing
Delpoint-----	Depth to rock Erosion by water Lime content Limited available water capacity Slope Soil blowing
22F: Hillon-----	Erosion by water Lime content Slope Soil blowing
27B: Attewan-----	Excessive permeability Limited available water capacity Potential for ground-water pollution Soil blowing
28: Nishon-----	Ponding Potential for ground-water pollution Soil blowing
30B: Marvan-----	Lime content Poor tilth Restricted permeability Soil blowing
30C: Marvan-----	Erosion by water Lime content Poor tilth Restricted permeability Soil blowing
31A: Ferd-----	Soil blowing
32B: Kobase-----	Lime content Poor tilth Soil blowing
32C: Kobase-----	Erosion by water Lime content Poor tilth Soil blowing

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
32D: Kobase-----	Erosion by water Lime content Poor tilth Slope Soil blowing
33A: Phillips-----	Soil blowing
34A: Linnet-----	Poor tilth Soil blowing
35B: Assinniboine-----	Soil blowing
36B: Chinook-----	Soil blowing
36C: Chinook-----	Soil blowing
37B: Evanston-----	Soil blowing
37C: Evanston-----	Erosion by water Soil blowing
38B: Ethridge-----	None
39B: Assinniboine-----	Soil blowing
43A: Pendroy-----	Poor tilth Restricted permeability Soil blowing
44B: Kevin-----	Lime content Soil blowing
47B: Marias-----	Lime content Poor tilth Restricted permeability Soil blowing
47C: Marias-----	Erosion by water Lime content Poor tilth Restricted permeability Soil blowing

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
48A: Vanda-----	Poor tilth Restricted permeability Salt content Sodium content Soil blowing Surface crusting
48C: Vanda-----	Erosion by water Poor tilth Restricted permeability Salt content Sodium content Soil blowing Surface crusting
50A: Telstad-----	Soil blowing
55B: Lihen-----	Excessive permeability Potential for ground-water pollution Soil blowing
56A: Scobey-----	Soil blowing
57B: Absarokee-----	Depth to rock Limited available water capacity Soil blowing
57C: Absarokee-----	Depth to rock Erosion by water Limited available water capacity Soil blowing
57E: Absarokee-----	Depth to rock Erosion by water Limited available water capacity Slope Soil blowing
Reeder-----	Depth to rock Erosion by water Slope Soil blowing
58B: Lonna-----	Lime content Soil blowing
58C: Lonna-----	Erosion by water Lime content Soil blowing

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
60A: Havre-----	Soil blowing
63: Lardell-----	Limited available water capacity Poor tilth Potential for ground-water pollution Salt content Sodium content Soil blowing Surface crusting Water table
67B: Bearpaw-----	Soil blowing
67C: Bearpaw-----	Erosion by water Soil blowing
68B: Gerber-----	Poor tilth Soil blowing
69C: Vida-----	Erosion by water Soil blowing
Zahill-----	Erosion by water Lime content Soil blowing
71D: Roy-----	Limited available water capacity Poor tilth Slope Soil blowing Surface rock fragments
72F: Zahill-----	Erosion by water Lime content Slope Soil blowing
73B: Yetull-----	Excessive permeability Limited available water capacity Potential for ground-water pollution Soil blowing
Lonesome-----	Excessive permeability Potential for ground-water pollution Soil blowing
74C: Shambo-----	Erosion by water Soil blowing

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
75B: Farnuf-----	Soil blowing
75C: Farnuf-----	Erosion by water Soil blowing
76C: Hedoes-----	Erosion by water Soil blowing
77E: Tinsley-----	Erosion by water Excessive permeability Limited available water capacity Potential for ground-water pollution Slope Soil blowing
79B: Yamacall-----	Soil blowing
79C: Yamacall-----	Erosion by water Soil blowing
79D: Yamacall-----	Erosion by water Slope Soil blowing
81A: Glendive-----	Soil blowing
82B: Savage-----	None
86B: Work-----	Soil blowing
86C: Work-----	Erosion by water Soil blowing
86D: Work-----	Erosion by water Slope Soil blowing
87B: Tamaneen-----	Soil blowing
88C: Perma-----	Limited available water capacity Soil blowing
90A: Harlake-----	Lime content Poor tilth Soil blowing

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
92E:	
Sunburst-----	Erosion by water Lime content Poor tilth Slope Soil blowing
Bascovy-----	Depth to rock Erosion by water Limited available water capacity Poor tilth Restricted permeability Slope Sodium content Soil blowing Surface crusting
93F:	
Yetull-----	Erosion by water Excessive permeability Limited available water capacity Potential for ground-water pollution Slope Soil blowing
94B:	
Busby-----	Soil blowing
94C:	
Busby-----	Soil blowing
94D:	
Busby-----	Erosion by water Slope Soil blowing
96B:	
Macar-----	Soil blowing
96C:	
Macar-----	Erosion by water Soil blowing
98B:	
Kremlin-----	Soil blowing
98C:	
Kremlin-----	Erosion by water Soil blowing
99:	
Rivra-----	Excessive permeability Flooding Limited available water capacity Potential for ground-water pollution Soil blowing
Manly-----	Excessive permeability Flooding Potential for ground-water pollution Soil blowing

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
110C: Laceycreek-----	Erosion by water Soil blowing
110D: Laceycreek-----	Erosion by water Slope Soil blowing
110E: Laceycreek-----	Erosion by water Slope Soil blowing
130A: Nesda-----	Excessive permeability Flooding Limited available water capacity Potential for ground-water pollution Soil blowing
Nesda-----	Excessive permeability Flooding Limited available water capacity Potential for ground-water pollution Soil blowing Surface rock fragments
McIlwaine-----	Excessive permeability Flooding Limited available water capacity Potential for ground-water pollution Soil blowing
140A: Klayent-----	Lime content Poor tilth Potential for ground-water pollution Soil blowing Water table
141B: Migonot-----	Depth to rock Lime content Limited available water capacity Poor tilth Soil blowing
Weingart-----	Depth to rock Lime content Limited available water capacity Poor tilth Restricted permeability Salt content Sodium content Soil blowing Surface crusting

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
141B: (cont.)	
Delpoint-----	Depth to rock Lime content Limited available water capacity Soil blowing
142C:	
Megonot-----	Depth to rock Erosion by water Lime content Limited available water capacity Poor tilth Soil blowing
Kobase-----	Erosion by water Lime content Poor tilth Soil blowing
Delpoint-----	Depth to rock Erosion by water Lime content Limited available water capacity Soil blowing
160A:	
Bigsandy-----	Flooding Lime content Potential for ground-water pollution Soil blowing Water table
171C:	
Delpoint-----	Depth to rock Erosion by water Lime content Limited available water capacity Soil blowing
Cahbart-----	Depth to rock Erosion by water Lime content Limited available water capacity Soil blowing
180A:	
McIlwaine-----	Excessive permeability Limited available water capacity Potential for ground-water pollution Soil blowing
Nesda-----	Excessive permeability Limited available water capacity Potential for ground-water pollution Soil blowing
Straw-----	Lime content Soil blowing

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
182F:	
Megonot-----	Depth to rock Erosion by water Lime content Limited available water capacity Poor tilth Slope Soil blowing
Yawdim-----	Depth to rock Erosion by water Limited available water capacity Poor tilth Slope Soil blowing
200:	
Badland-----	Nonsoil material
201F:	
Cabba-----	Areas of rock outcrop Depth to rock Erosion by water Lime content Limited available water capacity Slope Soil blowing
Wayden-----	Areas of rock outcrop Depth to rock Erosion by water Limited available water capacity Poor tilth Slope Soil blowing
Rock outcrop-----	Nonsoil material
210C:	
Shane-----	Depth to rock Erosion by water Restricted permeability Soil blowing
Gerber-----	Erosion by water Poor tilth Soil blowing
210E:	
Shane-----	Depth to rock Erosion by water Restricted permeability Slope Soil blowing

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
210E: (cont.)	
Barkof-----	Depth to rock Erosion by water Lime content Limited available water capacity Poor tilth Restricted permeability Slope Soil blowing
Gerber-----	Erosion by water Poor tilth Slope Soil blowing
211F:	
Cabbart-----	Areas of rock outcrop Depth to rock Erosion by water Lime content Limited available water capacity Slope Soil blowing
Yawdim-----	Areas of rock outcrop Depth to rock Erosion by water Limited available water capacity Poor tilth Slope Soil blowing
Rock outcrop-----	Nonsoil material
212F:	
Cabbart-----	Depth to rock Erosion by water Lime content Limited available water capacity Slope Soil blowing
Hillon-----	Erosion by water Lime content Slope Soil blowing
221E:	
Hillon-----	Erosion by water Lime content Slope Soil blowing
Kevin-----	Erosion by water Lime content Slope Soil blowing

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
222D:	
Hillon-----	Erosion by water Lime content Slope Soil blowing
Delpoint-----	Depth to rock Erosion by water Lime content Limited available water capacity Slope Soil blowing
223E:	
Hillon-----	Erosion by water Lime content Slope Soil blowing
Fleak-----	Depth to rock Erosion by water Excessive permeability Limited available water capacity Potential for ground-water pollution Slope Soil blowing
224E:	
Hillon-----	Erosion by water Lime content Slope Soil blowing
Joplin-----	Erosion by water Lime content Slope Soil blowing
227F:	
Hillon-----	Areas of rock outcrop Erosion by water Lime content Slope Soil blowing
Fleak-----	Areas of rock outcrop Depth to rock Erosion by water Excessive permeability Limited available water capacity Potential for ground-water pollution Slope Soil blowing
Rock outcrop-----	Nonsoil material
229E:	
Hillon-----	Erosion by water Lime content Slope Soil blowing

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
229E: (cont.)	
Lambeth-----	Erosion by water Lime content Slope Soil blowing
232A:	
Acel-----	Surface crusting
251C:	
Bascovy-----	Depth to rock Erosion by water Limited available water capacity Poor tilth Restricted permeability Sodium content Soil blowing Surface crusting
Neldore-----	Depth to rock Erosion by water Limited available water capacity Poor tilth Soil blowing
251E:	
Bascovy-----	Depth to rock Erosion by water Limited available water capacity Poor tilth Restricted permeability Slope Sodium content Soil blowing Surface crusting
Neldore-----	Depth to rock Erosion by water Limited available water capacity Poor tilth Slope Soil blowing
252C:	
Bascovy-----	Depth to rock Erosion by water Limited available water capacity Poor tilth Restricted permeability Sodium content Soil blowing Surface crusting
Marvan-----	Lime content Poor tilth Restricted permeability Soil blowing

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
261B:	
Absher-----	Limited available water capacity Poor tilth Restricted permeability Salt content Sodium content Soil blowing Surface crusting
Nobe-----	Limited available water capacity Poor tilth Restricted permeability Salt content Sodium content Soil blowing Surface crusting
263A:	
Toston-----	Lime content Salt content Sodium content Soil blowing Surface crusting Water table
264A:	
Toston-----	Lime content Salt content Sodium content Soil blowing Surface crusting Water table
Nobe-----	Limited available water capacity Poor tilth Restricted permeability Salt content Sodium content Soil blowing Surface crusting Water table
265B:	
Absher-----	Limited available water capacity Poor tilth Restricted permeability Salt content Sodium content Soil blowing Surface crusting
Gerdrum-----	Poor tilth Restricted permeability Salt content Sodium content Soil blowing

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
272C:	
Attewan-----	Excessive permeability Limited available water capacity Potential for ground-water pollution Soil blowing
Tinsley-----	Excessive permeability Limited available water capacity Potential for ground-water pollution Soil blowing
301A:	
Marvan-----	Lime content Poor tilth Restricted permeability Soil blowing
Vanda-----	Poor tilth Restricted permeability Salt content Sodium content Soil blowing Surface crusting
301C:	
Marvan-----	Erosion by water Lime content Poor tilth Restricted permeability Soil blowing
Vanda-----	Erosion by water Poor tilth Restricted permeability Salt content Sodium content Soil blowing Surface crusting
303A:	
Flatcreek-----	Flooding Poor tilth Restricted permeability Salt content Soil blowing Water table
Nobe-----	Flooding Limited available water capacity Poor tilth Restricted permeability Salt content Sodium content Soil blowing Surface crusting Water table

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
305A:	
Marvan-----	Lime content Poor tilth Restricted permeability Salt content Sodium content Soil blowing Surface crusting
Nobe-----	Limited available water capacity Poor tilth Restricted permeability Salt content Sodium content Soil blowing Surface crusting
311B:	
Ferd-----	Soil blowing
Creed-----	Salt content Sodium content Soil blowing
Gerdrum-----	Poor tilth Restricted permeability Salt content Sodium content Soil blowing
311C:	
Ferd-----	Erosion by water Soil blowing
Creed-----	Erosion by water Salt content Sodium content Soil blowing
Gerdrum-----	Erosion by water Poor tilth Restricted permeability Salt content Sodium content Soil blowing
323B:	
Sagedale-----	Poor tilth Soil blowing
323C:	
Sagedale-----	Erosion by water Poor tilth Soil blowing
324B:	
Marcott-----	Poor tilth Potential for ground-water pollution Soil blowing Water table

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
331B:	
Phillips-----	Soil blowing
Elloam-----	Restricted permeability
	Salt content
	Sodium content
	Soil blowing
331C:	
Phillips-----	Erosion by water
	Soil blowing
Elloam-----	Erosion by water
	Restricted permeability
	Salt content
	Sodium content
	Soil blowing
334B:	
Phillips-----	Soil blowing
Kevin-----	Lime content
	Soil blowing
341B:	
Linnet-----	Poor tilth
	Soil blowing
Marias-----	Lime content
	Poor tilth
	Restricted permeability
	Soil blowing
351B:	
Kenilworth-----	Soil blowing
Fortbenton-----	Soil blowing
361B:	
Fortbenton-----	Soil blowing
362C:	
Chinook-----	Slope
	Soil blowing
Yetull-----	Excessive permeability
	Limited available water capacity
	Potential for ground-water pollution
	Slope
	Soil blowing
363B:	
Cozberg-----	Excessive permeability
	Lime content
	Potential for ground-water pollution
	Soil blowing
Chinook-----	Soil blowing

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
363C:	
Chinook-----	Slope Soil blowing
Lihen-----	Excessive permeability Potential for ground-water pollution Slope Soil blowing
364B:	
Chinook-----	Soil blowing
364C:	
Chinook-----	Erosion by water Soil blowing
365B:	
Fortbenton-----	Soil blowing
Chinook-----	Soil blowing
368C:	
Fortbenton-----	Erosion by water Soil blowing
Hillon-----	Erosion by water Lime content Soil blowing
372C:	
Evanston-----	Erosion by water Soil blowing
Yamacall-----	Erosion by water Lime content Soil blowing
375B:	
Evanston-----	Soil blowing
Lonna-----	Lime content Salt content Sodium content Soil blowing
377B:	
Evanston-----	Soil blowing
Degrad-----	Excessive permeability Potential for ground-water pollution Soil blowing
381B:	
Ethridge-----	Soil blowing
385B:	
Ethridge-----	None
Kobase-----	Lime content Poor tilth Soil blowing

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
386B:	
Ethridge-----	None
Evanston-----	Soil blowing
388A:	
Ethridge-----	None
Lonna-----	Lime content Soil blowing
402A:	
Gerdrum-----	Poor tilth Restricted permeability Salt content Sodium content Soil blowing
Absher-----	Limited available water capacity Poor tilth Restricted permeability Salt content Sodium content Soil blowing Surface crusting
Creed-----	Salt content Sodium content Soil blowing
410:	
Rock outcrop-----	Nonsoil material
Fleak-----	Areas of rock outcrop Depth to rock Erosion by water Excessive permeability Limited available water capacity Potential for ground-water pollution Slope Soil blowing
411D:	
Farnuf-----	Erosion by water Soil blowing
Reeder-----	Depth to rock Erosion by water Slope Soil blowing
411E:	
Reeder-----	Depth to rock Erosion by water Slope Soil blowing
Farnuf-----	Erosion by water Slope Soil blowing

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
421C:	
Joplin-----	Erosion by water Lime content Soil blowing
Hillon-----	Erosion by water Lime content Soil blowing
422C:	
Marmarth-----	Depth to rock Erosion by water Soil blowing
441C:	
Kevin-----	Erosion by water Lime content Soil blowing
Hillon-----	Erosion by water Lime content Soil blowing
442C:	
Kevin-----	Erosion by water Lime content Soil blowing
Elloam-----	Erosion by water Restricted permeability Salt content Sodium content Soil blowing
444D:	
Kevin-----	Erosion by water Lime content Slope Soil blowing
Scobey-----	Erosion by water Slope Soil blowing
451C:	
Turner-----	Excessive permeability Potential for ground-water pollution Soil blowing
Beaverton-----	Excessive permeability Limited available water capacity Potential for ground-water pollution Soil blowing Surface rock fragments
Beaverton-----	Excessive permeability Limited available water capacity Potential for ground-water pollution Soil blowing

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
460: Laceycreek-----	Erosion by water Slope Soil blowing
471B: Marias-----	Lime content Poor tilth Restricted permeability Soil blowing
Kobase-----	Lime content Poor tilth Soil blowing
481A: Bigsag-----	Lime content Poor tilth Potential for ground-water pollution Restricted permeability Salt content Sodium content Soil blowing Surface crusting Water table
493A: Enbar-----	Flooding Soil blowing Water table
Straw-----	Lime content Soil blowing
Eagleton-----	Flooding Potential for ground-water pollution Soil blowing Water table
503B: Telstad-----	Soil blowing
Joplin-----	Lime content Soil blowing
503C: Telstad-----	Erosion by water Soil blowing
Joplin-----	Erosion by water Lime content Soil blowing
510: Rock outcrop-----	Nonsoil material

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
510: (cont.)	
Belain-----	Areas of rock outcrop Depth to rock Erosion by water Limited available water capacity Potential for ground-water pollution Slope Soil blowing
511A:	
Martinsdale-----	Soil blowing
Turner-----	Excessive permeability Potential for ground-water pollution Soil blowing
511C:	
Martinsdale-----	Erosion by water Soil blowing
512C:	
Martinsdale-----	Erosion by water Slope Soil blowing Surface stones
521B:	
Thoeny-----	Restricted permeability Sodium content Soil blowing
Elloam-----	Restricted permeability Salt content Sodium content Soil blowing
Absher-----	Limited available water capacity Poor tilth Restricted permeability Salt content Sodium content Soil blowing Surface crusting
530F:	
Warwood-----	Erosion by water Short frost-free period Slope Soil blowing
531A:	
Sweetgrass-----	Excessive permeability Limited available water capacity Potential for ground-water pollution Soil blowing
Beaverton-----	Excessive permeability Limited available water capacity Potential for ground-water pollution Soil blowing Surface rock fragments

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
531C:	
Sweetgrass-----	Excessive permeability Limited available water capacity Potential for ground-water pollution Soil blowing
Beaverton-----	Excessive permeability Limited available water capacity Potential for ground-water pollution Soil blowing Surface rock fragments
Beaverton-----	Excessive permeability Limited available water capacity Potential for ground-water pollution Soil blowing
550F:	
Libeg-----	Erosion by water Limited available water capacity Short frost-free period Slope Soil blowing Surface rock fragments
Arrowpeak-----	Depth to rock Erosion by water Limited available water capacity Potential for ground-water pollution Short frost-free period Slope Soil blowing Surface rock fragments
Elkner-----	Erosion by water Short frost-free period Slope Soil blowing
551B:	
Lonesome-----	Excessive permeability Potential for ground-water pollution Soil blowing
560F:	
Elve-----	Areas of rock outcrop Erosion by water Limited available water capacity Short frost-free period Slope Soil blowing Surface rock fragments
Rock outcrop-----	Nonsoil material
561B:	
Scabey-----	Soil blowing
Kevin-----	Lime content Soil blowing

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
561C:	
Scobey-----	Erosion by water Soil blowing
Kevin-----	Erosion by water Lime content Soil blowing
562B:	
Scobey-----	Soil blowing
Linnet-----	Poor tilth Soil blowing
563A:	
Fortbenton-----	Soil blowing
Scobey-----	Soil blowing
580F:	
Garlet-----	Erosion by water Short frost-free period Slope Soil blowing Surface rock fragments
Elkner-----	Erosion by water Short frost-free period Slope Soil blowing
601A:	
Havre-----	Soil blowing
Glendive-----	Soil blowing
602A:	
Havre-----	None
603A:	
Havre-----	Flooding Soil blowing
Glendive-----	Flooding Soil blowing
605C:	
Yamacall-----	Erosion by water Soil blowing
Havre-----	Flooding Soil blowing
621E:	
Sagedale-----	Erosion by water Poor tilth Slope Soil blowing

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
621E: (cont.)	
Wayden-----	Depth to rock Erosion by water Limited available water capacity Poor tilth Slope Soil blowing
621F:	
Wayden-----	Depth to rock Erosion by water Limited available water capacity Poor tilth Slope Soil blowing
Sagedale-----	Erosion by water Poor tilth Slope Soil blowing
623F:	
Linwell-----	Erosion by water Poor tilth Slope Soil blowing
Winifred-----	Depth to rock Erosion by water Poor tilth Slope Soil blowing
630E:	
Crow-----	Erosion by water Short frost-free period Slope Soil blowing
Lubrecht-----	Depth to rock Erosion by water Short frost-free period Slope Soil blowing
641F:	
Norbert-----	Depth to rock Erosion by water Lime content Limited available water capacity Poor tilth Restricted permeability Slope Soil blowing

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
641F: (cont.)	
Barkof-----	Depth to rock Erosion by water Lime content Limited available water capacity Poor tilth Restricted permeability Slope Soil blowing
650D:	
Laceycreek-----	Erosion by water Short frost-free period Slope Soil blowing
Ambrant-----	Erosion by water Excessive permeability Limited available water capacity Potential for ground-water pollution Short frost-free period Slope Soil blowing
650F:	
Laceycreek-----	Erosion by water Short frost-free period Slope Soil blowing
Eaglecreek-----	Depth to rock Erosion by water Limited available water capacity Potential for ground-water pollution Short frost-free period Slope Soil blowing
653F:	
Fleak-----	Depth to rock Erosion by water Excessive permeability Limited available water capacity Potential for ground-water pollution Slope Soil blowing
Twilight-----	Depth to rock Erosion by water Limited available water capacity Slope Soil blowing
Yetull-----	Erosion by water Excessive permeability Limited available water capacity Potential for ground-water pollution Slope Soil blowing

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
654F:	
Fleak-----	Areas of rock outcrop Depth to rock Erosion by water Excessive permeability Limited available water capacity Potential for ground-water pollution Slope Soil blowing
Twilight-----	Areas of rock outcrop Depth to rock Erosion by water Limited available water capacity Slope Soil blowing
Rock outcrop-----	Nonsoil material
661E:	
Twilight-----	Depth to rock Erosion by water Limited available water capacity Slope Soil blowing
Fleak-----	Depth to rock Erosion by water Excessive permeability Limited available water capacity Potential for ground-water pollution Slope Soil blowing
671B:	
Bearpaw-----	Soil blowing
Vida-----	Soil blowing
671C:	
Bearpaw-----	Erosion by water Soil blowing
Vida-----	Erosion by water Soil blowing
673A:	
Bearpaw-----	Soil blowing
Daglum-----	Salt content Sodium content Soil blowing
674B:	
Bearpaw-----	Soil blowing
Waltham-----	Poor tilth Restricted permeability Salt content Sodium content Soil blowing

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
680F:	
Winkler-----	Erosion by water Limited available water capacity Short frost-free period Slope Soil blowing
Ambrant-----	Erosion by water Excessive permeability Limited available water capacity Potential for ground-water pollution Short frost-free period Slope Soil blowing
Winkler-----	Erosion by water Limited available water capacity Short frost-free period Slope Soil blowing
681C:	
Gerber-----	Erosion by water Poor tilth Soil blowing
691D:	
Vida-----	Erosion by water Slope Soil blowing
Williams-----	Erosion by water Slope Soil blowing
692D:	
Vida-----	Erosion by water Slope Soil blowing
Bearpaw-----	Erosion by water Slope Soil blowing
693C:	
Vida-----	Erosion by water Slope Soil blowing
Bearpaw-----	Erosion by water Soil blowing
Nishon-----	Ponding Potential for ground-water pollution Soil blowing
701E:	
Work-----	Erosion by water Slope Soil blowing

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
701E: (cont.)	
Absarokee-----	Depth to rock Erosion by water Limited available water capacity Slope Soil blowing
702E:	
Work-----	Erosion by water Slope Soil blowing Surface stones
Absarokee-----	Depth to rock Erosion by water Limited available water capacity Slope Soil blowing Surface stones
721E:	
Zahill-----	Erosion by water Lime content Slope Soil blowing
Vida-----	Erosion by water Slope Soil blowing
722F:	
Zahill-----	Erosion by water Lime content Slope Soil blowing
Sagedale-----	Erosion by water Poor tilth Slope Soil blowing
Wayden-----	Depth to rock Erosion by water Limited available water capacity Poor tilth Slope Soil blowing
723F:	
Zahill-----	Erosion by water Lime content Slope Soil blowing
Cabba-----	Depth to rock Erosion by water Lime content Limited available water capacity Slope Soil blowing

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
731F: Yetull-----	Erosion by water Excessive permeability Limited available water capacity Potential for ground-water pollution Slope Soil blowing
Dune land-----	Nonsoil material
741B: Shambo-----	Soil blowing
Straw-----	Flooding Lime content Soil blowing
745F: Shambo-----	Erosion by water Slope Soil blowing
Amor-----	Depth to rock Erosion by water Lime content Slope Soil blowing
Cabba-----	Depth to rock Erosion by water Lime content Limited available water capacity Slope Soil blowing
761C: Hedoes-----	Erosion by water Soil blowing
Belain-----	Depth to rock Erosion by water Limited available water capacity Potential for ground-water pollution Soil blowing
761E: Hedoes-----	Erosion by water Slope Soil blowing
Belain-----	Depth to rock Erosion by water Limited available water capacity Potential for ground-water pollution Slope Soil blowing
793B: Yamacall-----	Lime content Soil blowing

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
793C:	
Yamacall-----	Erosion by water
	Lime content
	Soil blowing
795C:	
Yamacall-----	Erosion by water
	Lime content
	Soil blowing
Benz-----	Erosion by water
	Lime content
	Salt content
	Sodium content
	Soil blowing
	Surface crusting
795D:	
Yamacall-----	Erosion by water
	Lime content
	Slope
	Soil blowing
Benz-----	Erosion by water
	Lime content
	Salt content
	Slope
	Sodium content
	Soil blowing
	Surface crusting
801B:	
Williams-----	Soil blowing
Vida-----	Soil blowing
801C:	
Williams-----	Erosion by water
	Soil blowing
Vida-----	Erosion by water
	Soil blowing
828A:	
Savage-----	Soil blowing
842A:	
Savage-----	Water table
Daglum-----	Salt content
	Sodium content
	Soil blowing
	Water table
863E:	
Work-----	Erosion by water
	Slope
	Soil blowing
	Surface rock fragments

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
863E: (cont.)	
Roy-----	Erosion by water Limited available water capacity Slope Soil blowing Surface stones
871B:	
Tamaneen-----	Soil blowing Surface rock fragments
871C:	
Tamaneen-----	Soil blowing Surface rock fragments
883F:	
Perma-----	Erosion by water Limited available water capacity Slope Soil blowing Surface rock fragments
Whitlash-----	Depth to rock Erosion by water Limited available water capacity Potential for ground-water pollution Slope Soil blowing Surface rock fragments
892F:	
Whitlash-----	Areas of rock outcrop Depth to rock Erosion by water Limited available water capacity Potential for ground-water pollution Slope Soil blowing Surface rock fragments
Belain-----	Areas of rock outcrop Depth to rock Erosion by water Limited available water capacity Potential for ground-water pollution Slope Soil blowing
Rock outcrop-----	Nonsoil material
895F:	
Belain-----	Depth to rock Erosion by water Limited available water capacity Potential for ground-water pollution Slope Soil blowing

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
895F: (cont.)	
Whitlash-----	Depth to rock Erosion by water Limited available water capacity Potential for ground-water pollution Slope Soil blowing
Hedoes-----	Erosion by water Slope Soil blowing
896E:	
Belain-----	Areas of rock outcrop Depth to rock Erosion by water Limited available water capacity Potential for ground-water pollution Slope Soil blowing
Whitlash-----	Areas of rock outcrop Depth to rock Erosion by water Limited available water capacity Potential for ground-water pollution Slope Soil blowing
Rock outcrop-----	Nonsoil material
911F:	
Belain-----	Depth to rock Erosion by water Limited available water capacity Potential for ground-water pollution Slope Soil blowing
Whitlash-----	Depth to rock Erosion by water Limited available water capacity Potential for ground-water pollution Slope Soil blowing
Hedoes-----	Erosion by water Slope Soil blowing
916C:	
Belain-----	Depth to rock Limited available water capacity Potential for ground-water pollution Soil blowing
Hedoes-----	Soil blowing

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
925F:	
Sunburst-----	Erosion by water Lime content Poor tilth Slope Soil blowing
Lambeth-----	Erosion by water Lime content Slope Soil blowing
941D:	
Busby-----	Erosion by water Slope Soil blowing
Twilight-----	Depth to rock Erosion by water Limited available water capacity Slope Soil blowing
943C:	
Tally-----	Soil blowing
943E:	
Tally-----	Erosion by water Slope Soil blowing
Vebar-----	Depth to rock Erosion by water Limited available water capacity Slope Soil blowing
943F:	
Tally-----	Erosion by water Slope Soil blowing
Cohagen-----	Depth to rock Erosion by water Limited available water capacity Slope Soil blowing
965F:	
Cabba-----	Depth to rock Erosion by water Lime content Limited available water capacity Slope Soil blowing
Macar-----	Erosion by water Slope Soil blowing

Main Cropland Limitations and Hazards--Continued

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Cropland limitations or hazards
971F:	
Neldore-----	Depth to rock Erosion by water Limited available water capacity Poor tilth Slope Soil blowing
Bascovy-----	Depth to rock Erosion by water Limited available water capacity Poor tilth Restricted permeability Slope Sodium content Soil blowing Surface crusting
972F:	
Neldore-----	Areas of rock outcrop Depth to rock Erosion by water Limited available water capacity Poor tilth Slope Soil blowing
Rock outcrop-----	Nonsoil material
974F:	
Neldore-----	Depth to rock Erosion by water Limited available water capacity Poor tilth Slope Soil blowing
Hillon-----	Erosion by water Lime content Slope Soil blowing
DA:	
Denied access-----	Onsite required
M-W	
Miscellaneous water-----	Nonsoil material
W:	
Water-----	Nonsoil material

Land Capability and Yields Per Acre of Crops

(Yields are those that can be expected under a high level of nonirrigated management by component name. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil. The listing of a crop yield does not endorse the use of a soil for that crop.)

Map symbol and soil name	Land capability	Winter wheat	Spring wheat	Barley	Alfalfa hay	Safflower	Oats
		BU	BU	BU	Tons	Tons	BU
2: Riverwash-----							
2B: Marcott-----	6W	---	---	---	---	---	---
Big sandy-----	7W	---	---	---	---	---	---
12C: Beaverton-----	6S	24.0	21.0	37.0	---	---	32.0
Beaverton-----	6S	26.0	24.0	40.0	---	---	37.0
13C: Tanna-----	3E	32.0	28.0	48.0	---	---	47.0
15E: Lambeth-----	6E	39.0	35.0	58.0	---	---	61.0
15F: Lambeth-----	7E	---	---	---	---	---	---
16B: Degrand-----	3E	33.0	30.0	50.0	---	---	51.0
17B: Delpoint-----	4E	32.0	28.0	48.0	---	---	47.0
21E: Cabhart-----	7E	13.0	12.0	23.0	---	---	13.0
Delpoint-----	6E	24.0	21.0	37.0	---	---	32.0
22F: Hillon-----	7E	---	---	---	---	---	---
27B: Attewan-----	3E	32.0	29.0	49.0	---	---	48.0
28: Nishon-----	5W	25.0	23.0	39.0	---	---	35.0
30B: Marvan-----	4E	34.0	31.0	52.0	---	---	53.0
30C: Marvan-----	4E	34.0	31.0	52.0	---	---	53.0
31A: Ferd-----	3E	44.0	39.0	64.0	---	---	69.0
32B: Kobase-----	4E	41.0	36.0	60.0	---	---	63.0
32C: Kobase-----	4E	41.0	36.0	60.0	---	---	63.0

Land Capability and Yields Per Acre of Crops--Continued

(Yields are those that can be expected under a high level of nonirrigated management by component name. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil. The listing of a crop yield does not endorse the use of a soil for that crop.)

Map symbol and soil name	Land capability	Winter wheat	Spring wheat	Barley	Alfalfa hay	Safflower	Oats
		BU	BU	BU	Tons	Tons	BU
32D: Kobase-----	4E	34.0	31.0	52.0	---	---	53.0
33A: Phillips-----	3E	44.0	39.0	64.0	---	---	69.0
34A: Linnet-----	4E	44.0	39.0	64.0	---	---	69.0
35B: Assinniboine----	4E	40.0	35.0	58.0	---	---	61.0
36B: Chinook-----	4E	35.0	32.0	53.0	---	---	55.0
36C: Chinook-----	4E	35.0	32.0	53.0	---	---	55.0
37B: Evanston-----	3E	45.0	40.0	65.0	---	---	72.0
37C: Evanston-----	3E	45.0	40.0	65.0	---	---	72.0
38B: Ethridge-----	3E	45.0	40.0	65.0	---	---	70.0
39B: Assinniboine----	3E	41.0	36.0	60.0	---	---	63.0
43A: Pendroy-----	4E	41.0	37.0	61.0	---	---	64.0
44B: Kevin-----	3E	44.0	39.0	63.0	---	---	68.0
47B: Marias-----	4E	44.0	38.0	63.0	---	---	68.0
47C: Marias-----	4E	44.0	38.0	63.0	---	---	68.0
48A: Vanda-----	7S	---	---	---	---	---	---
48C: Vanda-----	7S	---	---	---	---	---	---
50A: Telstad-----	3E	45.0	40.0	65.0	---	---	72.0
55B: Lihsen-----	6E	27.0	25.0	43.0	---	---	40.0
56A: Scobey-----	3E	45.0	40.0	65.0	---	---	70.0

Land Capability and Yields Per Acre of Crops--Continued

(Yields are those that can be expected under a high level of nonirrigated management by component name. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil. The listing of a crop yield does not endorse the use of a soil for that crop.)

Map symbol and soil name	Land capability	Winter wheat	Spring wheat	Barley	Alfalfa hay	Safflower	Oats
		BU	BU	BU	Tons	Tons	BU
57B: Absarokee-----	3E	50.0	44.0	70.0	2.5	---	78.0
57C: Absarokee-----	3E	50.0	44.0	70.0	2.2	---	78.0
57E: Absarokee-----	6E	37.0	32.0	53.0	1.5	---	54.0
Reeder-----	6E	44.0	39.0	64.0	1.5	---	69.0
58B: Lonna-----	4E	41.0	37.0	60.0	---	---	64.0
58C: Lonna-----	4E	41.0	37.0	60.0	---	---	64.0
60A: Havre-----	3E	44.0	39.0	64.0	---	---	69.0
63: Lardell-----	7S	---	---	---	---	---	---
67B: Bearpaw-----	3E	48.0	42.0	70.0	2.5	1500.0	77.0
67C: Bearpaw-----	3E	48.0	42.0	70.0	2.2	1300.0	77.0
68B: Gerber-----	4E	48.0	42.0	70.0	2.5	1500.0	77.0
69C: Vida-----	3E	48.0	42.0	70.0	2.2	---	77.0
Zahill-----	4E	45.0	40.0	65.0	2.2	---	72.0
71D: Roy-----	6E	21.0	19.0	35.0	---	---	29.0
72F: Zahill-----	7E	---	---	---	---	---	---
73B: Yetull-----	6E	17.0	16.0	29.0	---	---	22.0
Lonesome-----	6E	28.0	25.0	43.0	---	---	41.0
74C: Shambo-----	3E	54.0	48.0	76.0	2.2	---	86.0
75B: Farnuf-----	3E	48.0	43.0	70.0	2.5	1500.0	78.0
75C: Farnuf-----	3E	48.0	43.0	70.0	2.2	1300.0	78.0

Land Capability and Yields Per Acre of Crops--Continued

(Yields are those that can be expected under a high level of nonirrigated management by component name. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil. The listing of a crop yield does not endorse the use of a soil for that crop.)

Map symbol and soil name	Land capability	Winter wheat	Spring wheat	Barley	Alfalfa hay	Safflower	Oats
		BU	BU	BU	Tons	Tons	BU
76C: Hedoes-----	3E	56.0	49.0	79.0	2.2	---	89.0
77F: Tinsley-----	7E	---	---	---	---	---	---
79B: Yamacall-----	3E	44.0	39.0	64.0	---	---	69.0
79C: Yamacall-----	3E	44.0	39.0	64.0	---	---	69.0
79D: Yamacall-----	4E	41.0	37.0	60.0	---	---	64.0
81A: Glendive-----	4E	41.0	37.0	60.0	---	---	64.0
82B: Savage-----	3E	46.0	41.0	68.0	2.5	1500.0	74.0
86B: Work-----	3E	59.0	52.0	82.0	3.0	---	94.0
86C: Work-----	3E	59.0	52.0	82.0	2.7	---	94.0
86D: Work-----	4E	52.0	47.0	74.0	2.4	---	83.0
87B: Tamaneen-----	3E	46.0	42.0	67.0	2.5	---	73.0
88C: Perma-----	3E	43.0	38.0	61.0	2.5	---	65.0
90A: Harlake-----	4E	44.0	39.0	63.0	---	---	68.0
92E: Sunburst-----	6E	24.0	22.0	37.0	---	---	33.0
Bascovy-----	6E	20.0	18.0	33.0	---	---	26.0
93F: Yetull-----	7E	---	---	---	---	---	---
94B: Busby-----	4E	34.0	31.0	52.0	---	---	53.0
94C: Busby-----	4E	34.0	31.0	52.0	---	---	53.0
94D: Busby-----	4E	34.0	31.0	52.0	---	---	53.0
96B: Macar-----	3E	47.0	42.0	69.0	2.5	---	76.0

Land Capability and Yields Per Acre of Crops--Continued

(Yields are those that can be expected under a high level of nonirrigated management by component name. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil. The listing of a crop yield does not endorse the use of a soil for that crop.)

Map symbol and soil name	Land capability	Winter wheat	Spring wheat	Barley	Alfalfa hay	Safflower	Oats
		BU	BU	BU	Tons	Tons	BU
96C: Macar-----	3E	47.0	42.0	69.0	2.2	---	76.0
98B: Kremlin-----	3E	47.0	42.0	68.0	---	---	75.0
98C: Kremlin-----	3E	47.0	42.0	68.0	---	---	75.0
99: Rivra-----	6W	---	---	---	---	---	---
Hanly-----	6W	---	---	---	---	---	---
110C: Lacey Creek-----	3E	55.0	48.0	75.0	3.0	---	89.0
110D: Lacey Creek-----	4E	52.0	46.0	72.0	2.4	---	85.0
110E: Lacey Creek-----	6E	---	---	---	2.0	---	---
130A: Nesda-----	6W	37.0	32.0	53.0	---	---	54.0
Nesda-----	6W	31.0	27.0	46.0	---	---	44.0
McIlwaine-----	4W	48.0	43.0	69.0	---	---	75.0
140A: Klayent-----	4W	---	---	---	---	---	---
141B: Migonot-----	4E	27.0	24.0	41.0	---	---	39.0
Weingart-----	6S	---	---	---	---	---	---
Delpoint-----	4E	32.0	28.0	48.0	---	---	47.0
142C: Migonot-----	4E	27.0	24.0	41.0	---	---	39.0
Kobase-----	4E	41.0	36.0	60.0	---	---	63.0
Delpoint-----	4E	32.0	28.0	48.0	---	---	47.0
160A: Bigsandy-----	4W	---	---	---	---	---	---
171C: Delpoint-----	4E	32.0	28.0	48.0	---	---	47.0
Cabbart-----	6S	21.0	19.0	35.0	---	---	29.0
180A: McIlwaine-----	4E	46.0	41.0	67.0	2.5	---	71.0

Land Capability and Yields Per Acre of Crops--Continued

(Yields are those that can be expected under a high level of nonirrigated management by component name. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil. The listing of a crop yield does not endorse the use of a soil for that crop.)

Map symbol and soil name	Land capability	Winter wheat	Spring wheat	Barley	Alfalfa hay	Safflower	Oats
		BU	BU	BU	Tons	Tons	BU
180A: (cont.)							
Nesda-----	6S	35.0	31.0	52.0	2.0	---	51.0
Straw-----	3E	68.0	60.0	94.0	3.0	---	110.0
182F:							
Megonot-----	7E	---	---	---	---	---	---
Yawdim-----	7E	---	---	---	---	---	---
200:							
Badland-----							
201F:							
Cabba-----	7E	---	---	---	---	---	---
Wayden-----	7E	---	---	---	---	---	---
Rock outcrop---							
210C:							
Shane-----	4E	56.0	49.0	79.0	2.2	---	89.0
Gerber-----	4E	60.0	53.0	83.0	2.7	---	95.0
210E:							
Shane-----	6E	43.0	38.0	62.0	1.5	---	66.0
Barkof-----	6E	37.0	32.0	53.0	1.5	---	54.0
Gerber-----	4E	52.0	47.0	75.0	2.4	---	84.0
211F:							
Cabbart-----	7E	---	---	---	---	---	---
Yawdim-----	7E	---	---	---	---	---	---
Rock outcrop---							
212F:							
Cabbart-----	7E	---	---	---	---	---	---
Hillon-----	7E	---	---	---	---	---	---
221E:							
Hillon-----	6E	33.0	29.0	50.0	---	---	50.0
Kevin-----	4E	41.0	36.0	60.0	---	---	63.0
222D:							
Hillon-----	6E	33.0	30.0	50.0	---	---	51.0
Delpoint-----	6E	24.0	21.0	37.0	---	---	32.0

Land Capability and Yields Per Acre of Crops--Continued

(Yields are those that can be expected under a high level of nonirrigated management by component name. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil. The listing of a crop yield does not endorse the use of a soil for that crop.)

Map symbol and soil name	Land capability	Winter wheat	Spring wheat	Barley	Alfalfa hay	Safflower	Oats
		BU	BU	BU	Tons	Tons	BU
223E:							
Hillon-----	6E	---	---	---	---	---	---
Fleak-----	7E	---	---	---	---	---	---
224E:							
Hillon-----	6E	33.0	30.0	50.0	---	---	51.0
Joplin-----	4E	41.0	37.0	60.0	---	---	64.0
227F:							
Hillon-----	7E	---	---	---	---	---	---
Fleak-----	7E	---	---	---	---	---	---
Rock outcrop----							
229E:							
Hillon-----	6E	---	---	---	---	---	---
Lambeth-----	6E	---	---	---	---	---	---
232A:							
Acel-----	4E	48.0	42.0	68.0	---	---	74.0
251C:							
Bascovy-----	4E	32.0	28.0	48.0	---	---	47.0
Neldore-----	6S	19.0	17.0	32.0	---	---	25.0
251E:							
Bascovy-----	6E	20.0	18.0	33.0	---	---	26.0
Neldore-----	7E	7.0	8.0	16.0	---	---	4.0
252C:							
Bascovy-----	4E	32.0	28.0	48.0	---	---	47.0
Marvan-----	4E	34.0	31.0	52.0	---	---	53.0
261B:							
Absher-----	7S	---	---	---	---	---	---
Nobe-----	7S	---	---	---	---	---	---
263A:							
Toston-----	6S	---	---	---	---	---	---
264A:							
Toston-----	6S	---	---	---	---	---	---
Nobe-----	7S	---	---	---	---	---	---

Land Capability and Yields Per Acre of Crops--Continued

(Yields are those that can be expected under a high level of nonirrigated management by component name. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil. The listing of a crop yield does not endorse the use of a soil for that crop.)

Map symbol and soil name	Land capability	Winter wheat	Spring wheat	Barley	Alfalfa hay	Safflower	Oats
		BU	BU	BU	Tons	Tons	BU
265B:							
Absher-----	7S	---	---	---	---	---	---
Gerdrum-----	6S	22.0	21.0	36.0	---	---	31.0
272C:							
Attewan-----	3E	32.0	29.0	49.0	---	---	48.0
Tinsley-----	7S	10.0	9.0	20.0	---	---	9.0
301A:							
Marvan-----	4E	34.0	31.0	52.0	---	---	53.0
Vanda-----	7S	---	---	---	---	---	---
301C:							
Marvan-----	4E	34.0	31.0	52.0	---	---	53.0
Vanda-----	7S	---	---	---	---	---	---
303A:							
Flatcreek-----	6W	---	---	---	---	---	---
Nobe-----	7S	---	---	---	---	---	---
305A:							
Marvan-----	6S	3.0	3.0	1.0	---	---	---
Nobe-----	7S	---	---	---	---	---	---
311B:							
Ferd-----	3E	44.0	39.0	64.0	---	---	69.0
Creed-----	4S	24.0	22.0	37.0	---	---	33.0
Gerdrum-----	6S	22.0	21.0	36.0	---	---	31.0
311C:							
Ferd-----	3E	44.0	39.0	64.0	---	---	69.0
Creed-----	4E	24.0	22.0	37.0	---	---	33.0
Gerdrum-----	6E	22.0	21.0	36.0	---	---	31.0
323B:							
Sagedale-----	4E	48.0	42.0	70.0	2.5	---	77.0
323C:							
Sagedale-----	4E	48.0	42.0	70.0	2.2	---	77.0
324B:							
Marcott-----	4W	49.0	44.0	72.0	2.0	---	79.0
331B:							
Phillips-----	3E	44.0	39.0	64.0	---	---	69.0
Elloam-----	6S	25.0	22.0	38.0	---	---	34.0

Land Capability and Yields Per Acre of Crops--Continued

(Yields are those that can be expected under a high level of nonirrigated management by component name. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil. The listing of a crop yield does not endorse the use of a soil for that crop.)

Map symbol and soil name	Land capability	Winter wheat	Spring wheat	Barley	Alfalfa hay	Safflower	Oats
		BU	BU	BU	Tons	Tons	BU
331C:							
Phillips-----	3E	44.0	39.0	64.0	---	---	69.0
Elloam-----	6E	25.0	22.0	38.0	---	---	34.0
334B:							
Phillips-----	3E	44.0	39.0	64.0	---	---	69.0
Kevin-----	3E	44.0	39.0	63.0	---	---	68.0
341B:							
Linnet-----	4E	41.0	36.0	60.0	---	---	63.0
Marias-----	4E	40.0	35.0	58.0	---	---	61.0
351B:							
Kenilworth-----	4E	46.0	41.0	66.0	---	---	73.0
Fortbenton-----	4E	42.0	38.0	62.0	---	---	66.0
361B:							
Fortbenton-----	4E	42.0	38.0	62.0	---	---	66.0
362C:							
Chinook-----	4E	35.0	32.0	53.0	---	---	55.0
Yetull-----	6E	17.0	16.0	29.0	---	---	22.0
363B:							
Cozberg-----	4E	36.0	32.0	55.0	---	---	56.0
Chinook-----	4E	35.0	32.0	53.0	---	---	55.0
363C:							
Chinook-----	4E	35.0	32.0	53.0	---	---	55.0
Lihen-----	4E	30.0	26.0	45.0	---	---	43.0
364B:							
Chinook-----	3E	40.0	35.0	58.0	---	---	61.0
364C:							
Chinook-----	3E	40.0	35.0	58.0	---	---	61.0
365B:							
Fortbenton-----	4E	42.0	38.0	62.0	---	---	66.0
Chinook-----	4E	35.0	32.0	53.0	---	---	55.0
368C:							
Fortbenton-----	4E	42.0	38.0	62.0	---	---	66.0
Hillon-----	4E	42.0	38.0	62.0	---	---	66.0
372C:							
Evanston-----	3E	45.0	40.0	65.0	---	---	72.0

Land Capability and Yields Per Acre of Crops--Continued

(Yields are those that can be expected under a high level of nonirrigated management by component name. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil. The listing of a crop yield does not endorse the use of a soil for that crop.)

Map symbol and soil name	Land capability	Winter wheat	Spring wheat	Barley	Alfalfa hay	Safflower	Oats
		BU	BU	BU	Tons	Tons	BU
372C: (cont.)							
Yamacall-----	4E	45.0	40.0	65.0	---	---	70.0
375B:							
Evanston-----	3E	44.0	39.0	64.0	---	---	69.0
Lonna-----	4E	41.0	37.0	60.0	---	---	64.0
377B:							
Evanston-----	3E	45.0	40.0	65.0	---	---	72.0
Degrad-----	3E	33.0	30.0	50.0	---	---	51.0
381B:							
Ethridge-----	3E	45.0	40.0	65.0	---	---	70.0
385B:							
Ethridge-----	3E	45.0	40.0	65.0	---	---	70.0
Kobase-----	4E	41.0	36.0	60.0	---	---	63.0
386B:							
Ethridge-----	3E	45.0	40.0	65.0	---	---	70.0
Evanston-----	3E	45.0	40.0	65.0	---	---	72.0
388A:							
Ethridge-----	3E	50.0	44.0	70.0	---	---	78.0
Lonna-----	4E	45.0	41.0	65.0	---	---	70.0
402A:							
Gerdum-----	6S	22.0	21.0	36.0	---	---	31.0
Absher-----	7S	---	---	---	---	---	---
Creed-----	4S	24.0	22.0	37.0	---	---	33.0
410:							
Rock outcrop---							
Fleak-----	7E	---	---	---	---	---	---
411D:							
Farnuf-----	3E	60.0	53.0	83.0	2.7	---	96.0
Reeder-----	4E	51.0	46.0	73.0	1.8	---	80.0
411E:							
Reeder-----	6E	---	---	---	1.5	---	---
Farnuf-----	4E	56.0	50.0	80.0	2.4	---	90.0
421C:							
Joplin-----	3E	44.0	39.0	64.0	---	---	69.0
Hillon-----	4E	42.0	38.0	62.0	---	---	66.0

Land Capability and Yields Per Acre of Crops--Continued

(Yields are those that can be expected under a high level of nonirrigated management by component name. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil. The listing of a crop yield does not endorse the use of a soil for that crop.)

Map symbol and soil name	Land capability	Winter wheat	Spring wheat	Barley	Alfalfa hay	Safflower	Oats
		BU	BU	BU	Tons	Tons	BU
422C: Marmarth-----	3E	35.0	32.0	53.0	---	---	55.0
441C: Kevin-----	3E	44.0	39.0	63.0	---	---	68.0
Hillon-----	4E	42.0	37.0	61.0	---	---	65.0
442C: Kevin-----	3E	44.0	39.0	63.0	---	---	68.0
Elloam-----	6E	25.0	22.0	38.0	---	---	34.0
444D: Kevin-----	4E	41.0	36.0	60.0	---	---	63.0
Scobey-----	4E	39.0	35.0	58.0	---	---	61.0
451C: Turner-----	3E	42.0	37.0	61.0	2.3	---	65.0
Beaverton-----	6S	24.0	21.0	37.0	1.7	---	32.0
Beaverton-----	6S	26.0	24.0	40.0	1.7	---	37.0
460: Lacey Creek-----	6E	47.0	42.0	66.0	---	---	76.0
471B: Marias-----	4E	44.0	38.0	63.0	---	---	68.0
Kobase-----	4E	41.0	36.0	60.0	---	---	63.0
481A: Bigsag-----	7W	---	---	---	---	---	---
493A: Enbar-----	3W	61.0	54.0	86.0	2.5	---	99.0
Straw-----	3E	57.0	51.0	82.0	2.5	---	94.0
Eagleton-----	5W	---	---	---	---	---	---
503B: Telstad-----	3E	45.0	40.0	65.0	---	---	72.0
Joplin-----	3E	44.0	39.0	64.0	---	---	69.0
503C: Telstad-----	3E	45.0	40.0	65.0	---	---	72.0
Joplin-----	3E	44.0	39.0	64.0	---	---	69.0
510: Rock outcrop----							
Belain-----	7E	---	---	---	---	---	---

Land Capability and Yields Per Acre of Crops--Continued

(Yields are those that can be expected under a high level of nonirrigated management by component name. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil. The listing of a crop yield does not endorse the use of a soil for that crop.)

Map symbol and soil name	Land capability	Winter wheat	Spring wheat	Barley	Alfalfa hay	Safflower	Oats
		BU	BU	BU	Tons	Tons	BU
511A:							
Martinsdale-----	3E	47.0	42.0	68.0	2.5	---	75.0
Turner-----	3E	42.0	37.0	61.0	2.3	---	65.0
511C:							
Martinsdale-----	3E	47.0	42.0	68.0	2.2	---	75.0
512C:							
Martinsdale-----	6S	55.0	48.0	77.0	---	---	88.0
521B:							
Thoeny-----	4S	29.0	26.0	45.0	---	---	43.0
Elloam-----	6S	25.0	22.0	38.0	---	---	34.0
Absher-----	7S	---	---	---	---	---	---
530F:							
Warwood-----	7E	---	---	---	---	---	---
531A:							
Sweetgrass-----	3E	35.0	32.0	53.0	2.3	---	55.0
Beaverton-----	6S	24.0	21.0	37.0	2.0	---	32.0
531C:							
Sweetgrass-----	3E	35.0	32.0	53.0	2.0	---	55.0
Beaverton-----	6S	24.0	21.0	37.0	1.7	---	32.0
Beaverton-----	6S	26.0	24.0	40.0	1.7	---	37.0
550F:							
Libeg-----	7E	---	---	---	---	---	---
Arrowpeak-----	7E	---	---	---	---	---	---
Elkner-----	7E	---	---	---	---	---	---
551B:							
Lonesome-----	6E	31.0	27.0	47.0	---	---	45.0
560F:							
Elve-----	7E	---	---	---	---	---	---
Rock outcrop----							
561B:							
Scobey-----	3E	45.0	40.0	65.0	---	---	70.0
Kevin-----	3E	44.0	39.0	63.0	---	---	68.0
561C:							
Scobey-----	3E	45.0	40.0	65.0	---	---	70.0
Kevin-----	3E	44.0	39.0	63.0	---	---	68.0

Land Capability and Yields Per Acre of Crops--Continued

(Yields are those that can be expected under a high level of nonirrigated management by component name. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil. The listing of a crop yield does not endorse the use of a soil for that crop.)

Map symbol and soil name	Land capability	Winter wheat	Spring wheat	Barley	Alfalfa hay	Safflower	Oats
		BU	BU	BU	Tons	Tons	BU
562B:							
Scobey-----	3E	45.0	40.0	65.0	---	---	70.0
Linnet-----	4E	41.0	36.0	60.0	---	---	63.0
563A:							
Fortbenton-----	4E	42.0	38.0	62.0	---	---	66.0
Scobey-----	4E	44.0	39.0	63.0	---	---	68.0
580F:							
Garlet-----	7E	---	---	---	---	---	---
Elkner-----	7E	---	---	---	---	---	---
601A:							
Havre-----	3E	44.0	39.0	64.0	---	---	69.0
Glendive-----	4E	41.0	37.0	60.0	---	---	64.0
602A:							
Havre-----	3E	44.0	39.0	63.0	---	---	68.0
603A:							
Havre-----	3W	44.0	39.0	64.0	---	---	69.0
Glendive-----	4W	41.0	36.0	60.0	---	---	63.0
605C:							
Yamacall-----	3E	44.0	39.0	64.0	---	---	69.0
Havre-----	6W	44.0	39.0	64.0	---	---	69.0
621E:							
Sagedale-----	6E	36.0	32.0	55.0	---	---	56.0
Wayden-----	7E	13.0	12.0	23.0	---	---	13.0
621F:							
Wayden-----	7E	---	---	---	---	---	---
Sagedale-----	7E	---	---	---	---	---	---
623F:							
Linwell-----	7E	---	---	---	---	---	---
Winifred-----	6E	---	---	---	---	---	---
630E:							
Crow-----	6E	37.0	33.0	53.0	---	---	59.0
Lubrecht-----	6E	25.0	22.0	37.0	---	---	36.0
641F:							
Norbert-----	7E	---	---	---	---	---	---
Barkof-----	7E	---	---	---	---	---	---

Land Capability and Yields Per Acre of Crops--Continued

(Yields are those that can be expected under a high level of nonirrigated management by component name. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil. The listing of a crop yield does not endorse the use of a soil for that crop.)

Map symbol and soil name	Land capability	Winter wheat	Spring wheat	Barley	Alfalfa hay	Safflower	Oats
		BU	BU	BU	Tons	Tons	BU
650D:							
Laceycreek-----	4E	52.0	46.0	71.0	---	---	84.0
Ambrant-----	4E	34.0	29.0	48.0	---	---	51.0
650F:							
Laceycreek-----	6E	---	---	---	---	---	---
Eaglecreek-----	7E	---	---	---	---	---	---
653F:							
Fleak-----	7E	---	---	---	---	---	---
Twilight-----	7E	---	---	---	---	---	---
Yetull-----	7E	---	---	---	---	---	---
654F:							
Fleak-----	7E	---	---	---	---	---	---
Twilight-----	7E	---	---	---	---	---	---
Rock outcrop----							
661E:							
Twilight-----	6E	28.0	25.0	43.0	---	---	41.0
Fleak-----	7E	7.0	8.0	16.0	---	---	4.0
671B:							
Bearpaw-----	3E	48.0	42.0	70.0	2.5	1500.0	77.0
Vida-----	3E	48.0	42.0	70.0	2.5	1500.0	77.0
671C:							
Bearpaw-----	3E	48.0	42.0	70.0	2.2	1300.0	77.0
Vida-----	3E	48.0	42.0	70.0	2.2	1300.0	77.0
673A:							
Bearpaw-----	3E	48.0	42.0	70.0	2.5	1500.0	77.0
Daglum-----	4S	32.0	29.0	49.0	2.0	1200.0	48.0
674B:							
Bearpaw-----	3E	48.0	42.0	70.0	2.5	1500.0	77.0
Waltham-----	6S	33.0	30.0	50.0	2.0	900.0	51.0
680F:							
Winkler-----	7E	---	---	---	---	---	---
Ambrant-----	7E	---	---	---	---	---	---
Winkler-----	7E	---	---	---	---	---	---
681C:							
Gerber-----	4E	48.0	42.0	70.0	2.2	1500.0	77.0

Land Capability and Yields Per Acre of Crops--Continued

(Yields are those that can be expected under a high level of nonirrigated management by component name. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil. The listing of a crop yield does not endorse the use of a soil for that crop.)

Map symbol and soil name	Land capability	Winter wheat	Spring wheat	Barley	Alfalfa hay	Safflower	Oats
		BU	BU	BU	Tons	Tons	BU
691D:							
Vida-----	4E	46.0	41.0	66.0	1.9	---	73.0
Williams-----	4E	48.0	43.0	70.0	1.9	---	78.0
692D:							
Vida-----	4E	45.0	40.0	65.0	1.9	---	72.0
Bearpaw-----	4E	42.0	38.0	62.0	1.9	---	66.0
693C:							
Vida-----	4E	45.0	40.0	65.0	1.9	---	72.0
Bearpaw-----	3E	48.0	42.0	70.0	2.2	---	77.0
Nishon-----	5W	30.0	26.0	45.0	---	---	43.0
701E:							
Work-----	4E	52.0	47.0	74.0	2.4	---	83.0
Absarokee-----	6E	37.0	32.0	53.0	1.5	---	54.0
702E:							
Work-----	6E	35.0	31.0	52.0	---	---	51.0
Absarokee-----	6E	26.0	23.0	40.0	---	---	35.0
721E:							
Zahill-----	6E	36.0	32.0	55.0	1.5	---	56.0
Vida-----	4E	45.0	40.0	65.0	1.9	---	72.0
722F:							
Zahill-----	7E	---	---	---	---	---	---
Sagedale-----	7E	---	---	---	---	---	---
Wayden-----	7E	---	---	---	---	---	---
723F:							
Zahill-----	7E	---	---	---	---	---	---
Cabba-----	7E	---	---	---	---	---	---
731F:							
Yetull-----	7E	---	---	---	---	---	---
Dune land-----							
741B:							
Shambo-----	3E	54.0	48.0	76.0	2.5	---	86.0
Straw-----	3W	55.0	49.0	78.0	2.5	---	89.0
745F:							
Shambo-----	6E	---	---	---	---	---	---
Amor-----	7E	---	---	---	---	---	---

Land Capability and Yields Per Acre of Crops--Continued

(Yields are those that can be expected under a high level of nonirrigated management by component name. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil. The listing of a crop yield does not endorse the use of a soil for that crop.)

Map symbol and soil name	Land capability	Winter wheat	Spring wheat	Barley	Alfalfa hay	Safflower	Oats
		BU	BU	BU	Tons	Tons	BU
745F: (cont.) Cabba-----	7E	---	---	---	---	---	---
761C: Hedoes-----	3E	56.0	49.0	79.0	2.2	---	89.0
Belain-----	4E	41.0	37.0	61.0	1.7	---	64.0
761E: Hedoes-----	4E	56.0	49.0	79.0	1.9	---	89.0
Belain-----	6E	38.0	34.0	56.0	1.0	---	58.0
793B: Yamacall-----	4E	45.0	40.0	65.0	---	---	70.0
793C: Yamacall-----	4E	45.0	40.0	65.0	---	---	70.0
795C: Yamacall-----	4E	45.0	40.0	65.0	---	---	70.0
Benz-----	6E	---	---	---	---	---	---
795D: Yamacall-----	4E	42.0	37.0	61.0	---	---	65.0
Benz-----	6E	---	---	---	---	---	---
801B: Williams-----	3E	51.0	45.0	74.0	2.5	1500.0	83.0
Vida-----	3E	48.0	43.0	70.0	2.5	1500.0	78.0
801C: Williams-----	3E	51.0	45.0	74.0	2.2	1300.0	83.0
Vida-----	3E	48.0	43.0	70.0	2.2	1300.0	78.0
828A: Savage-----	3E	48.0	42.0	70.0	2.5	1500.0	77.0
842A: Savage-----	4S	49.0	44.0	72.0	2.0	---	79.0
Daglun-----	6S	36.0	32.0	55.0	1.6	---	56.0
863E: Work-----	6E	45.0	39.0	64.0	---	---	69.0
Roy-----	6E	26.0	22.0	39.0	---	---	34.0
871B: Tamaneen-----	3E	46.0	41.0	67.0	2.5	---	71.0
871C: Tamaneen-----	3E	46.0	41.0	67.0	2.2	---	71.0

Land Capability and Yields Per Acre of Crops--Continued

(Yields are those that can be expected under a high level of nonirrigated management by component name. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil. The listing of a crop yield does not endorse the use of a soil for that crop.)

Map symbol and soil name	Land capability	Winter wheat	Spring wheat	Barley	Alfalfa hay	Safflower	Oats
		BU	BU	BU	Tons	Tons	BU
883F:							
Perma-----	7E	---	---	---	---	---	---
Whitlash-----	7E	---	---	---	---	---	---
892F:							
Whitlash-----	7E	---	---	---	---	---	---
Belain-----	7E	---	---	---	---	---	---
Rock outcrop----							
895F:							
Belain-----	7E	---	---	---	---	---	---
Whitlash-----	7E	---	---	---	---	---	---
Hedoes-----	7E	---	---	---	---	---	---
896E:							
Belain-----	6E	38.0	34.0	56.0	---	---	58.0
Whitlash-----	7E	17.0	16.0	29.0	---	---	20.0
Rock outcrop----							
911F:							
Belain-----	7E	---	---	---	---	---	---
Whitlash-----	7E	---	---	---	---	---	---
Hedoes-----	7E	---	---	---	---	---	---
916C:							
Belain-----	4E	37.0	32.0	53.0	1.7	---	54.0
Hedoes-----	4E	56.0	49.0	79.0	2.2	---	89.0
925F:							
Sunburst-----	7E	---	---	---	---	---	---
Lambeth-----	7E	---	---	---	---	---	---
941D:							
Busby-----	4E	34.0	31.0	52.0	---	---	53.0
Twilight-----	4E	31.0	27.0	47.0	---	---	45.0
943C:							
Tally-----	4E	42.0	37.0	61.0	2.2	---	65.0
943E:							
Tally-----	6E	39.0	35.0	58.0	---	---	61.0
Vebar-----	6E	31.0	28.0	47.0	---	---	46.0
943F:							
Tally-----	7E	---	---	---	---	---	---

Land Capability and Yields Per Acre of Crops--Continued

(Yields are those that can be expected under a high level of nonirrigated management by component name. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil. The listing of a crop yield does not endorse the use of a soil for that crop.)

Map symbol and soil name	Land capability	Winter wheat	Spring wheat	Barley	Alfalfa hay	Safflower	Oats
		BU	BU	BU	Tons	Tons	BU
943F: (cont.)							
Cohagen-----	7E	---	---	---	---	---	---
965F:							
Cabba-----	7E	---	---	---	---	---	---
Macar-----	6E	---	---	---	---	---	---
971F:							
Neldore-----	7E	---	---	---	---	---	---
Bascovy-----	7E	---	---	---	---	---	---
972F:							
Neldore-----	7E	---	---	---	---	---	---
Rock outcrop----							
974F:							
Neldore-----	7E	---	---	---	---	---	---
Hillon-----	7E	---	---	---	---	---	---
DA:							
Denied access----							
M-W:							
Miscellaneous water-----							
W:							
Water-----							

Prime Farmland

(Only irrigated areas that the product of soil erodibility (I) and climate factor (C) does not exceed 60 are prime farmland.)

Map Symbol	Soil name
16B	Degradand loam, 0 to 4 percent slopes (where irrigated)
27B	Attewan loam, 0 to 4 percent slopes (where irrigated)
37B	Evanston loam, 0 to 4 percent slopes (where irrigated)
38B	Ethridge silty clay loam, 0 to 4 percent slopes (where irrigated)
39B	Assinniboine loam, 0 to 4 percent slopes (where irrigated)
44B	Kevin clay loam, 0 to 4 percent slopes (where irrigated)
50A	Telstad loam, 0 to 2 percent slopes (where irrigated)
56A	Scobey clay loam, 0 to 2 percent slopes (where irrigated)
57B	Absarokee clay loam, 0 to 4 percent slopes
60A	Havre loam, 0 to 2 percent slopes (where irrigated)
67B	Bearpaw clay loam, 0 to 4 percent slopes
75B	Farnuf loam, 0 to 4 percent slopes
79B	Yamacall loam, 0 to 4 percent slopes (where irrigated)
82B	Savage silty clay loam, 0 to 4 percent slopes
86B	Work clay loam, 0 to 4 percent slopes
87B	Tamaneen clay loam, 0 to 4 percent slopes
96B	Macar loam, 0 to 4 percent slopes
98B	Kremlin loam, 0 to 4 percent slopes (where irrigated)
364B	Chinook loam, 0 to 4 percent slopes (where irrigated)
377B	Evanston-Degradand loams, 0 to 4 percent slopes (where irrigated)
381B	Ethridge clay loam, 0 to 4 percent slopes (where irrigated)
386B	Ethridge-Evanston complex, 0 to 4 percent slopes (where irrigated)
503B	Telstad-Joplin loams, 0 to 4 percent slopes (where irrigated)
511A	Martinsdale-Turner loams, 0 to 2 percent slopes
561B	Scobey-Kevin clay loams, 0 to 4 percent slopes (where irrigated)
602A	Havre silty clay loam, 0 to 1 percent slopes (where irrigated)
671B	Bearpaw-Vida clay loams, 0 to 4 percent slopes
801B	Williams-Vida loams, 0 to 4 percent slopes
828A	Savage loam, 0 to 2 percent slopes

Windbreak Suitability Groups

(Suitable shrubs and trees with their mature heights are listed in the adjoining Windbreak Suitability Group Species List. A dashed entry indicates a woodland unit and a windbreak suitability group is not assigned. Absence of an entry indicates that a windbreak suitability group is not assigned.)

Soil name and map symbol	Windbreak suitability group
2:	
Riverwash-----	4
2B:	
Marcott-----	3S
Bigsandy-----	4
12C:	
Beaverton-----	3M
Beaverton-----	3M
13C:	
Tanna-----	2M
15E:	
Lambeth-----	4
15F:	
Lambeth-----	4
16B:	
Degrad-----	2M
17B:	
Delpoint-----	2M
21E:	
Cabbart-----	4
Delpoint-----	4
22F:	
Hillon-----	4
27B:	
Attewan-----	2M
28:	
Nishon-----	4
30B:	
Marvan-----	3S
30C:	
Marvan-----	3S
31A:	
Ferd-----	2M
32B:	
Kobase-----	1
32C:	
Kobase-----	1
32D:	
Kobase-----	1

Windbreak Suitability Groups--Continued

(Suitable shrubs and trees with their mature heights are listed in the adjoining Windbreak Suitability Group Species List. A dashed entry indicates a woodland unit and a windbreak suitability group is not assigned. Absence of an entry indicates that a windbreak suitability group is not assigned.)

Soil name and map symbol	Windbreak suitability group
33A:	
Phillips-----	2M
34A:	
Linnet-----	1
35B:	
Assinniboine-----	2M
36B:	
Chinook-----	2M
36C:	
Chinook-----	2M
37B:	
Evanston-----	1
37C:	
Evanston-----	1
38B:	
Ethridge-----	1
39B:	
Assinniboine-----	2M
43A:	
Pendroy-----	2M
44B:	
Kevin-----	1
47B:	
Marias-----	2M
47C:	
Marias-----	2M
48A:	
Vanda-----	4
48C:	
Vanda-----	4
50A:	
Telstad-----	1
55B:	
Lihen-----	3M
56A:	
Scobey-----	1
57B:	
Absarokee-----	2M

Windbreak Suitability Groups--Continued

(Suitable shrubs and trees with their mature heights are listed in the adjoining Windbreak Suitability Group Species List. A dashed entry indicates a woodland unit and a windbreak suitability group is not assigned. Absence of an entry indicates that a windbreak suitability group is not assigned.)

Soil name and map symbol	Windbreak suitability group
57C:	
Absarokee-----	2M
57E:	
Absarokee-----	4
Reeder-----	4
58B:	
Lonna-----	1
58C:	
Lonna-----	1
60A:	
Havre-----	1
63:	
Lardell-----	4
67B:	
Bearpaw-----	1
67C:	
Bearpaw-----	1
68B:	
Gerber-----	1
69C:	
Vida-----	1
Zahill-----	1
71D:	
Roy-----	2M
72F:	
Zahill-----	4
73B:	
Yetull-----	3M
Lonesome-----	2M
74C:	
Shambo-----	1
75B:	
Farnuf-----	1
75C:	
Farnuf-----	1
76C:	
Hedoes-----	2M
77E:	
Tinsley-----	4

Windbreak Suitability Groups--Continued

(Suitable shrubs and trees with their mature heights are listed in the adjoining Windbreak Suitability Group Species List. A dashed entry indicates a woodland unit and a windbreak suitability group is not assigned. Absence of an entry indicates that a windbreak suitability group is not assigned.)

Soil name and map symbol	Windbreak suitability group
79B: Yamacall-----	2M
79C: Yamacall-----	2M
79D: Yamacall-----	2M
81A: Glendive-----	2M
82B: Savage-----	1
86B: Work-----	1
86C: Work-----	1
86D: Work-----	1
87B: Tamaneen-----	3L
88C: Perma-----	3M
90A: Harlake-----	1
92E: Sunburst-----	4
Bascovy-----	4
93F: Yetull-----	4
94B: Busby-----	2M
94C: Busby-----	2M
94D: Busby-----	2M
96B: Macar-----	1
96C: Macar-----	1
98B: Kremlin-----	1

Windbreak Suitability Groups--Continued

(Suitable shrubs and trees with their mature heights are listed in the adjoining Windbreak Suitability Group Species List. A dashed entry indicates a woodland unit and a windbreak suitability group is not assigned. Absence of an entry indicates that a windbreak suitability group is not assigned.)

Soil name and map symbol	Windbreak suitability group
98C:	
Kremlin-----	1
99:	
Rivra-----	---
Hanly-----	---
110C:	
Laceycreek-----	1
110D:	
Laceycreek-----	1
110E:	
Laceycreek-----	4
130A:	
Nesda-----	---
Nesda-----	---
McIlwaine-----	---
140A:	
Klayent-----	3W
141B:	
Megonot-----	2M
Weingart-----	3S
Delpoint-----	2M
142C:	
Megonot-----	2M
Kobase-----	1
Delpoint-----	2M
160A:	
Bigsandy-----	3W
171C:	
Delpoint-----	2M
Cabbart-----	3M
180A:	
McIlwaine-----	3M
Nesda-----	3M
Straw-----	1
182F:	
Megonot-----	4
Yawdim-----	4
200:	
Badland-----	4
201F:	
Cabba-----	4
Wayden-----	4
Rock outcrop-----	4

Windbreak Suitability Groups--Continued

(Suitable shrubs and trees with their mature heights are listed in the adjoining Windbreak Suitability Group Species List. A dashed entry indicates a woodland unit and a windbreak suitability group is not assigned. Absence of an entry indicates that a windbreak suitability group is not assigned.)

Soil name and map symbol	Windbreak suitability group
210C:	
Shane-----	2M
Gerber-----	1
210E:	
Shane-----	4
Barkof-----	4
Gerber-----	1
211F:	
Cabbart-----	4
Yawdim-----	4
Rock outcrop-----	4
212F:	
Cabbart-----	4
Hillon-----	4
221E:	
Hillon-----	4
Kevin-----	1
222D:	
Hillon-----	4
Delpoint-----	4
223E:	
Hillon-----	4
Fleak-----	4
224E:	
Hillon-----	4
Joplin-----	1
227F:	
Hillon-----	4
Fleak-----	4
Rock outcrop-----	4
229E:	
Hillon-----	4
Lambeth-----	4
232A:	
Acel-----	2M
251C:	
Bascovy-----	3M
Neldore-----	3M
251E:	
Bascovy-----	4
Neldore-----	4
252C:	
Bascovy-----	3M
Marvan-----	3S

Windbreak Suitability Groups--Continued

(Suitable shrubs and trees with their mature heights are listed in the adjoining Windbreak Suitability Group Species List. A dashed entry indicates a woodland unit and a windbreak suitability group is not assigned. Absence of an entry indicates that a windbreak suitability group is not assigned.)

Soil name and map symbol	Windbreak suitability group
261B:	
Absher-----	4
Nobe-----	4
263A:	
Toston-----	3S
264A:	
Toston-----	3S
Nobe-----	4
265B:	
Absher-----	4
Gerdrum-----	3S
272C:	
Attewan-----	2M
Tinsley-----	4
301A:	
Marvan-----	3S
Vanda-----	4
301C:	
Marvan-----	3S
Vanda-----	4
303A:	
Flatcreek-----	3S
Nobe-----	4
305A:	
Marvan-----	3S
Nobe-----	4
311B:	
Ferd-----	2M
Creed-----	3S
Gerdrum-----	3S
311C:	
Ferd-----	2M
Creed-----	3S
Gerdrum-----	3S
323B:	
Sagedale-----	1
323C:	
Sagedale-----	1
324B:	
Marcott-----	3W
331B:	
Phillips-----	2M
Elloam-----	3S

Windbreak Suitability Groups--Continued

(Suitable shrubs and trees with their mature heights are listed in the adjoining Windbreak Suitability Group Species List. A dashed entry indicates a woodland unit and a windbreak suitability group is not assigned. Absence of an entry indicates that a windbreak suitability group is not assigned.)

Soil name and map symbol	Windbreak suitability group
331C:	
Phillips-----	2M
Elloam-----	3S
334B:	
Phillips-----	2M
Kevin-----	1
341B:	
Linnet-----	1
Marias-----	2M
351B:	
Kenilworth-----	2M
Fortbenton-----	2M
361B:	
Fortbenton-----	2M
362C:	
Chinook-----	2M
Yetull-----	3M
363B:	
Cozberg-----	2M
Chinook-----	2M
363C:	
Chinook-----	2M
Lihen-----	3M
364B:	
Chinook-----	2M
364C:	
Chinook-----	2M
365B:	
Fortbenton-----	2M
Chinook-----	2M
368C:	
Fortbenton-----	2M
Hillon-----	1
372C:	
Evanston-----	1
Yamacall-----	2M
375B:	
Evanston-----	1
Lonna-----	1
377B:	
Evanston-----	1
Degrad-----	2M

Windbreak Suitability Groups--Continued

(Suitable shrubs and trees with their mature heights are listed in the adjoining Windbreak Suitability Group Species List. A dashed entry indicates a woodland unit and a windbreak suitability group is not assigned. Absence of an entry indicates that a windbreak suitability group is not assigned.)

Soil name and map symbol	Windbreak suitability group
381B:	
Ethridge-----	1
385B:	
Ethridge-----	1
Kobase-----	1
386B:	
Ethridge-----	1
Evanston-----	1
388A:	
Ethridge-----	1
Lonna-----	1
402A:	
Gerdrum-----	3S
Absher-----	4
Creed-----	3S
410:	
Rock outcrop-----	4
Fleak-----	4
411D:	
Farnuf-----	1
Reeder-----	2M
411E:	
Reeder-----	4
Farnuf-----	1
421C:	
Joplin-----	1
Hillon-----	1
422C:	
Marmarth-----	2M
441C:	
Kevin-----	1
Hillon-----	1
442C:	
Kevin-----	1
Elloam-----	3S
444D:	
Kevin-----	1
Scobey-----	1
451C:	
Turner-----	2M
Beaverton-----	3M
Beaverton-----	3M

Windbreak Suitability Groups--Continued

(Suitable shrubs and trees with their mature heights are listed in the adjoining Windbreak Suitability Group Species List. A dashed entry indicates a woodland unit and a windbreak suitability group is not assigned. Absence of an entry indicates that a windbreak suitability group is not assigned.)

Soil name and map symbol	Windbreak suitability group
460: Laceycreek-----	---
471B: Marias----- Kobase-----	2M 1
481A: Bigsag-----	4
493A: Enbar----- Straw----- Eagleton-----	2W 1 3W
503B: Telstad----- Joplin-----	1 1
503C: Telstad----- Joplin-----	1 1
510: Rock outcrop----- Belain-----	4 4
511A: Martinsdale----- Turner-----	2L 2L
511C: Martinsdale-----	2L
512C: Martinsdale-----	2L
521B: Thoeny----- Elloam----- Absher-----	3S 3S 4
530F: Warwood-----	---
531A: Sweetgrass----- Beaverton-----	2L 3M
531C: Sweetgrass----- Beaverton----- Beaverton-----	2L 3M 3M
550F: Libeg----- Arrowpeak----- Elkner-----	4 4 ---

Windbreak Suitability Groups--Continued

(Suitable shrubs and trees with their mature heights are listed in the adjoining Windbreak Suitability Group Species List. A dashed entry indicates a woodland unit and a windbreak suitability group is not assigned. Absence of an entry indicates that a windbreak suitability group is not assigned.)

Soil name and map symbol	Windbreak suitability group
551B:	
Lonesome-----	2M
560F:	
Elve-----	---
Rock outcrop-----	4
561B:	
Scobey-----	1
Kevin-----	1
561C:	
Scobey-----	1
Kevin-----	1
562B:	
Scobey-----	1
Linnet-----	1
563A:	
Fortbenton-----	2M
Scobey-----	1
580F:	
Garlet-----	---
Elkner-----	---
601A:	
Havre-----	1
Glendive-----	2M
602A:	
Havre-----	1
603A:	
Havre-----	---
Glendive-----	---
605C:	
Yamacall-----	2M
Havre-----	1
621E:	
Sagedale-----	4
Wayden-----	4
621F:	
Wayden-----	4
Sagedale-----	4
623F:	
Linwell-----	4
Winifred-----	4
630E:	
Crow-----	---
Lubrecht-----	---

Windbreak Suitability Groups--Continued

(Suitable shrubs and trees with their mature heights are listed in the adjoining Windbreak Suitability Group Species List. A dashed entry indicates a woodland unit and a windbreak suitability group is not assigned. Absence of an entry indicates that a windbreak suitability group is not assigned.)

Soil name and map symbol	Windbreak suitability group
641F:	
Norbert-----	4
Barkof-----	4
650D:	
Laceycreek-----	---
Ambrant-----	---
650F:	
Laceycreek-----	---
Eaglecreek-----	---
653F:	
Fleak-----	4
Twilight-----	4
Yetull-----	4
654F:	
Fleak-----	---
Twilight-----	4
Rock outcrop-----	4
661E:	
Twilight-----	4
Fleak-----	4
671B:	
Bearpaw-----	1
Vida-----	1
671C:	
Bearpaw-----	1
Vida-----	1
673A:	
Bearpaw-----	1
Daglun-----	3S
674B:	
Bearpaw-----	1
Waltham-----	3S
680F:	
Winkler-----	---
Ambrant-----	---
Winkler-----	---
681C:	
Gerber-----	1
691D:	
Vida-----	1
Williams-----	1
692D:	
Vida-----	1
Bearpaw-----	1

Windbreak Suitability Groups--Continued

(Suitable shrubs and trees with their mature heights are listed in the adjoining Windbreak Suitability Group Species List. A dashed entry indicates a woodland unit and a windbreak suitability group is not assigned. Absence of an entry indicates that a windbreak suitability group is not assigned.)

Soil name and map symbol	Windbreak suitability group
693C:	
Vida-----	1
Bearpaw-----	1
Nishon-----	4
701E:	
Work-----	1
Absarokee-----	4
702E:	
Work-----	4
Absarokee-----	4
721E:	
Zahill-----	4
Vida-----	1
722F:	
Zahill-----	4
Sagedale-----	4
Wayden-----	4
723F:	
Zahill-----	4
Cabba-----	4
731F:	
Yetull-----	4
Dune land-----	4
741B:	
Shambo-----	1
Straw-----	1
745F:	
Shambo-----	4
Amor-----	4
Cabba-----	4
761C:	
Hedoes-----	2M
Belain-----	3M
761E:	
Hedoes-----	2M
Belain-----	4
793B:	
Yamacall-----	2M
793C:	
Yamacall-----	2M
795C:	
Yamacall-----	2M
Benz-----	3S

Windbreak Suitability Groups--Continued

(Suitable shrubs and trees with their mature heights are listed in the adjoining Windbreak Suitability Group Species List. A dashed entry indicates a woodland unit and a windbreak suitability group is not assigned. Absence of an entry indicates that a windbreak suitability group is not assigned.)

Soil name and map symbol	Windbreak suitability group
795D:	
Yamacall-----	2M
Benz-----	3S
801B:	
Williams-----	1
Vida-----	1
801C:	
Williams-----	1
Vida-----	1
828A:	
Savage-----	1
842A:	
Savage-----	2S
Daglum-----	3S
863E:	
Work-----	4
Roy-----	4
871B:	
Tamaneen-----	3L
871C:	
Tamaneen-----	3L
883F:	
Perma-----	4
Whitlash-----	4
892F:	
Whitlash-----	4
Belain-----	4
Rock outcrop-----	4
895F:	
Belain-----	4
Whitlash-----	---
Hedoes-----	4
896E:	
Belain-----	4
Whitlash-----	4
Rock outcrop-----	4
911F:	
Belain-----	4
Whitlash-----	4
Hedoes-----	4
916C:	
Belain-----	3M
Hedoes-----	2M

Windbreak Suitability Groups--Continued

(Suitable shrubs and trees with their mature heights are listed in the adjoining Windbreak Suitability Group Species List. A dashed entry indicates a woodland unit and a windbreak suitability group is not assigned. Absence of an entry indicates that a windbreak suitability group is not assigned.)

Soil name and map symbol	Windbreak suitability group
925F:	
Sunburst-----	4
Lambeth-----	4
941D:	
Busby-----	2M
Twilight-----	3M
943C:	
Tally-----	2M
943E:	
Tally-----	4
Vebar-----	4
943F:	
Tally-----	4
Cohagen-----	4
965F:	
Cabba-----	4
Macar-----	4
971F:	
Neldore-----	4
Bascovy-----	4
972F:	
Neldore-----	4
Rock outcrop-----	4
974F:	
Neldore-----	4
Hillon-----	4
DA:	
Denied access-----	
M-W:	
Miscellaneous water-----	
W:	
Water-----	

Windbreak Suitability Group Species List

(The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the height for that group. Windbreak suitability group 4 is generally not suited for windbreak development.)

Windbreak suitability group	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
1-----	Western sandcherry, Nanking cherry	Siberian peashrub, Rocky Mountain juniper, Tatarian honeysuckle, Siberian crabapple, ponderosa pine, blue spruce, common chokecherry, silver buffaloberry	Russian-olive, Siberian elm	---	---
2L-----	Western sandcherry, skunkbush sumac	Siberian peashrub, Russian-olive, Rocky Mountain juniper, ponderosa pine	Siberian elm	---	---
2M-----	Western sandcherry, skunkbush sumac	Siberian peashrub, Russian-olive, Rocky Mountain juniper, ponderosa pine	Siberian elm	---	---
2S-----	Skunkbush sumac	Rocky Mountain juniper, ponderosa pine, common chokecherry, silver buffaloberry	Russian-olive, Siberian elm	---	---
2W-----	Western sandcherry, purpleosier willow	Redosier dogwood, Siberian crabapple, common chokecherry, lilac	Russian-olive, green ash, ponderosa pine, blue spruce	Golden willow	Plains cottonwood
3L-----	Western sandcherry, Nanking cherry	Siberian peashrub, green ash, Rocky Mountain juniper, Siberian crabapple, ponderosa pine, blue spruce, common chokecherry, lilac	Russian-olive, Siberian elm	---	---
3M-----	Western sandcherry, skunkbush sumac	Siberian peashrub, Russian-olive, Rocky Mountain juniper, ponderosa pine	Siberian elm	---	---

Windbreak Suitability Group Species List--Continued

(The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the height for that group. Windbreak suitability group 4 is generally not suited for windbreak development.)

Windbreak suitability group	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
3S-----	Skunkbush sumac	Siberian peashrub, Rocky Mountain juniper, ponderosa pine, common chokecherry, silver buffaloberry	Russian-olive, Siberian elm	---	---
3W-----	Skunkbush sumac	Silver buffaloberry	Russian-olive	Siberian elm	---
4-----	---	---	---	---	---

Range

Most grazing is on native range. The range is used primarily for grazing by domestic livestock; however, it also is used as wildlife habitat, recreational areas, and watershed and has esthetic value.

In areas that have similar climate and topography, differences in the kind and amount of vegetation produced on range are closely related to the kind of soil. Effective management is based on the relationship between the soils and vegetation and water.

Range is defined as land on which the native vegetation (the climax, or natural potential, plant community) is predominantly grasses, grasslike plants, forbs, and shrubs suitable for grazing and browsing. Range includes natural grasslands, savannas, many wetlands, some deserts, tundra, and certain shrub and forb communities. Range receives no regular or frequent cultural treatment. The composition and production of the plant community are determined by soil, climate, topography, overstory canopy, and grazing management.

Grazed forest land is defined as land on which the understory includes, as an integral part of the forest plant community, plants that can be grazed without significant impairment of other forest values.

Native pasture is defined as land on which the potential (climax) vegetation is forest but which is used and managed primarily for the production of native forage plants. Native pasture includes cutover forest land and forest land that has been cleared and is managed for native or naturalized forage plants.

The table "Rangeland Productivity and Characteristic Plant Communities" at the end of this section shows, for each soil, the range site; the total annual production of vegetation in favorable, normal, and unfavorable years; the characteristic vegetation; and the average percentage of each species. Only those soils that are used as rangeland or are suited to use as rangeland are listed. Explanation of the column headings in this table follows.

Range site is a distinctive kind of rangeland that produces a characteristic natural plant community that differs from natural plant communities on other range sites in kind, amount, and proportion of range plants.

Many different range sites are in the survey area. Over time, the combination of plants best suited to a particular soil and climate has become established. If the soil is not excessively disturbed, this group of plants is the natural plant community for the site. Natural plant communities are not static but vary slightly from year to year and place to place.

The relationship between soils and vegetation was ascertained during this survey; thus, range sites generally can be determined directly from the soil map. Soil properties that affect moisture supply and plant nutrients have the greatest influence on the productivity of range plants. Soil reaction, salt content, and a seasonal high water table are also important. The "Field Office Technical Guide," which is available at local offices of the Natural Resources Conservation Service, can provide specific information about range sites.

Total production is the amount of vegetation that can be expected to grow annually on well managed range that is supporting the potential natural plant community. It includes all vegetation, whether or not it is palatable to grazing animals. It includes the current year's growth of leaves, twigs, and fruit of woody plants. It does not include the increase in stem diameter of trees and shrubs. It is expressed in pounds per acre of air-dry vegetation for favorable, normal, and unfavorable years. In a favorable year, the amount and distribution of precipitation and the temperatures make growing conditions substantially better than average. In a normal year, growing conditions are about average. In an unfavorable year, growing conditions are well below average, generally because of low available soil moisture.

Dry weight is the total annual yield per acre of air-dry vegetation. Yields are adjusted to a common percent of air-dry moisture content. The relationship of green weight to air-dry weight varies according to such factors as exposure, amount of shade, recent rains, and unseasonable dry periods.

Characteristic vegetation consists of the grasses, forbs, and shrubs that make up most of the potential natural plant community on each soil. The plants are listed by common name. Under *composition*, the

expected percentage of the total annual production is given for each species making up the characteristic vegetation. The amount that can be used as forage depends on the kinds of grazing animals and on the grazing season.

Range Condition

Range condition is based on a comparison of the present plant community with the potential natural plant community on a particular range site. The more closely the existing community resembles the natural community, the better the range condition.

Abnormal disturbances that change the natural plant community include repeated overuse by livestock, excessive burning, erosion, and plowing. Grazing animals select the most palatable plants. These plants will eventually die if they are continually grazed. A very severe disturbance can completely destroy the natural community. Under these conditions, the less desirable plants, such as annuals and weedlike plants, can invade. If the plant community has not deteriorated significantly, it eventually can return to dominantly natural plants if proper grazing management is applied.

Four range condition classes are used to show the degree of deterioration of the natural plant community.

An area of rangeland is in *excellent condition* if more than 75 percent of the present plant community is the same as the natural plant community. It is in *good condition* if the natural plants make up 51 to 75 percent of the present plant community, in *fair condition* if those plants make up 26 to 50 percent, and in *poor condition* if they make up less than 25 percent.

Knowledge of the range site and condition is necessary as a basis for planning and applying the management needed to maintain or improve the desired plant community for selected uses. Such information is needed to determine management objectives, proper grazing systems and stocking rates, suitable wildlife management practices, the potential for recreational uses, and the condition of watersheds.

Rangeland Management

Rangeland management requires a knowledge of the kinds of soil and of the potential natural plant community. It also requires an evaluation of the present range condition.

The objective in range management is to control grazing so that the plants growing on a site are about the same in kind and amount as the potential natural plant community for that site. Such management

generally results in the optimum production of vegetation, reduction of less desirable species, conservation of water, and control of erosion. Sometimes, however, a range condition somewhat below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources.

Grazing management is the most important part of any rangeland management program. Proper grazing use, timely deferment of grazing, and planned rotation grazing systems are key practices. The experience of ranchers and research have shown that if no more than one-half of the current year's growth is grazed, a plant community in good or excellent condition can be maintained and one in fair condition can be improved. The remaining one-half enables plants to make and store food for regrowth and root development. As a result, the desirable plants remain healthy and are not replaced by less desirable grasses and weeds. Also, the plant cover protects the soil from water erosion and soil blowing, improves tilth, increases the rate of water infiltration, and helps to control runoff.

Certain practices commonly are needed to obtain a uniform distribution of grazing. These include developing livestock watering facilities, fencing, properly locating salt and mineral supplements, constructing livestock trails in steeply sloping areas, and riding or herding.

Various kinds of grazing systems can be used in range management. No single grazing system is best under all conditions. The grazing system should increase the quantity and improve the quality of the range vegetation, should meet the needs of the individual operator, and should be designed according to the topography, the type of grazing animals, and the resource management objectives.

Special improvement practices are needed in areas where management practices do not achieve the desired results or where recovery is too slow under forage management alone. These include range seeding, brush management, water spreading, prescribed burning, and mechanical treatment.

Some soils are suited to mechanical treatment for range improvement. On other soils, however, only proper grazing management can improve the range. Many soils in capability classes 1 through 4 are suited to such practices as seeding, mechanical brush and weed control, and water spreading. Those in capability classes 7 and 8, however, are not suitable. Many soils in capability classes 1 through 4 are suited to tillage for seedbed preparation before native or introduced forage plant species are seeded. Soils in capability class 6 may be suited to limited surface disturbance, such as

scarification, for the purpose of seeding and as a means of increasing the rate of water intake for seed germination.

Where feasible, mechanical renovation practices, such as shallow chiseling, can help to speed recovery of the desired plants. These practices open up the surface and thus allow the absorption of more moisture and production of the more desirable plants. Mechanical renovation, brush management, and timely deferment of grazing allow recovery of the desired plants.

Seeding may be needed in areas where the less desirable plants are dominant. A clean, firm seedbed should be prepared, suitable species should be selected for seeding, and rest periods should be long enough to allow the new plants to become established.

Special improvement practices can be effective only if the management system helps to keep the desirable plants healthy.

Rangeland in the Chouteau County Area

Range makes up about 46 percent of the land in this survey area. The vegetation is mainly native grasses, grasslike plants, forbs, and shrubs. The majority of the rangeland is in the Western Glaciated Plains, and Foothills and Mountains geographic areas. The following range site descriptions of the survey area are grouped by their dominant soil and topographic characteristics, and are listed in order of natural productivity.

Soil groups that have the potential to be the most productive range sites because they receive more soil moisture than other range sites.

Subirrigated range site. This range site consists of very deep, poorly drained or somewhat poorly drained loams, clay loams, silty clay loams, and silty clays on flood plains, stream terraces, and alluvial fans. Slopes range from 0 to 3 percent. The water table is rarely above the surface, but an effective ground water table occurs throughout most of the growing season. Permeability is moderate to slow.

Saline lowland range site. This range site consists of very deep, somewhat poorly drained soils on flood plains. Slopes range from 0 to 2 percent. The soils have a loam to silty clay surface layer. The underlying material is sandy loam to clay. Permeability is moderate to slow. These soils contain enough salts that the majority of the vegetation is salt tolerant plants.

Overflow range site. This range site consists of very deep, well drained or poorly drained soils on flood plains and in closed depressions on till plains. Slopes range from 0 to 2 percent. The soils have a sandy loam to clay loam surface. The underlying material is sandy loam to clay. Permeability is moderate to very slow.

Soil groups with no obvious soil or moisture limiting factors. The vegetation can make a normal response to climate.

Sands range site. This range site consists of very deep, excessively drained to well drained soils on till plains, stream terraces, and hills. Slopes range from 0 to 45 percent. The soils have a loamy fine sand or fine sand surface layer. The underlying material is loamy fine sand to sand. Permeability is rapid. Some soils have slowly permeable loam to silty clay loam underlying material.

Sandy range site. This range site consists of very deep and moderately deep, well drained soils on till plains, stream terraces, flood plains, and hills. Slopes range from 0 to 25 percent. The soils have a sandy loam or fine sandy loam surface layer. The underlying material is dominantly sandy loam. Permeability is mainly moderately rapid.

Silty range site. This range site consists of moderately deep or very deep, well drained soils on till plains, stream terraces, alluvial fans, flood plains, and hills. Slopes range from 0 to 25 percent. The soils have a loam to very stony loam, clay loam, or silty clay loam surface layer. The underlying material is gravelly loam to clay loam. Permeability is moderately rapid to slow.

Clayey range site. This range site consists of very deep or moderately deep, well drained soils on till plains, stream terraces, alluvial fans, flood plains, and hills. Slopes range from 0 to 25 percent. The soils have a silty clay loam to clay surface layer and underlying material. Some areas are underlain by shale or sandstone at depths of 20 to 40 inches. Permeability is moderate to very slow.

Soil groups with soil properties or topographic features that limit available moisture or affect infiltration.

Silty steep range site. This range site is a phase departing from the normal silty range site with up to 20 percent lower production potential. It consists of very deep or moderately deep, well drained soils on mountains or hills. Slopes are dominantly more than 25 percent. The soils have a loam or cobbly loam surface layer. The underlying material is sandy loam to extremely cobbly loam. The soils are typically noncalcareous to depths of 10 inches or more.

Permeability is moderate or moderately rapid. These soils have moderate or high available water capacity but much of the precipitation runs off because of the steep slopes.

Clayey steep range site. This range site is a phase departing from the normal clayey range site with up to 20 percent lower production potential. It consists of very deep or moderately deep, well drained soils on hills. Slopes are dominantly more than 25 percent. The soils have a clay loam surface layer and the underlying material is silty clay loam to clay. They are typically noncalcareous to depths of 10 inches or more. Permeability is slow. Much of the precipitation runs off because of the slow intake and steep slopes.

Thin sandy range site. This range site consists of moderately deep and very deep, excessively drained to well drained soils on hills and escarpments. Slopes are dominantly more than 15 percent. The soils have a thin sandy loam or fine sandy loam surface layer and a strongly effervescent underlying material that is fine sandy loam to fine sand. Permeability is moderately rapid or rapid. This range site takes in water less rapidly due to the slope and is considered a droughty range site.

Thin silty range site. This range site consists of moderately deep and very deep, well drained soils on hills and escarpments. Slopes are dominantly more than 15 percent. The soils have a thin loam or silt loam surface layer and a strongly effervescent underlying material that is loam to silty clay loam. Permeability is moderate to slow. Although these soils have moderate or high available water capacity much of the precipitation runs off because of the steep slopes.

Thin clayey range site. This range site consists of moderately deep and very deep, well drained soils on hills and escarpments. Slopes are dominantly more than 15 percent and the site typically adjoins areas with silty or clayey range sites. The soils have a thin clay loam to silty clay surface layer and the underlying material is clay loam to silty clay that is strongly effervescent. Some areas are underlain by shale at depths of 20 to 40 inches. Permeability is slow or very slow. Although the soils have moderate or high available water capacity much of the precipitation runs off because of the slow intake and steep slopes.

Shallow to gravel range site. This range site consists of very deep, well drained soils on stream terraces and flood plains. Slopes range from 0 to 8 percent. The soils have a loam to very cobbly loam surface layer. The underlying material is extremely gravelly to very cobbly loamy sand or sand. Permeability is rapid. Available water capacity is low and it is a droughty range site.

Shallow range site. This range site consists of shallow, well drained soils on hills, escarpments, and mountains. Slopes range from 2 to 70 percent. The soils are clay loam to loamy sand and less than 20 inches to nearly impenetrable soft or hard bedrock. Some of the soils are stony or gravelly or have a calcareous root zone. These soils take in water readily but available water capacity is low.

Shallow clay range site. This range site consists of well drained, clay loam to silty clay soils underlain by shale at depths of 10 to 20 inches. It is on sedimentary plains, hills, and escarpments. Slopes range from 2 to 70 percent. Permeability is slow or very slow and considerable moisture is lost in runoff.

Claypan range site. This range site consists of very deep and moderately deep, well drained soils on stream terraces, alluvial fans, and till plains. Slopes range from 0 to 8 percent. The soils have a loam surface layer 2 to 8 inches thick over a hard, dense, slowly permeable clay or silty clay subsoil. The claypan subsoil is usually characterized by strong columnar structure, the result of a high concentration of sodium. This range site is commonly intermingled with silty and dense clay range sites.

Dense clay range site. This range site consists of very deep, well drained soils on stream terraces, alluvial fans, and till plains. Slopes range from 0 to 8 percent. The soils are silty clay loam, clay loam, or clay throughout and have varying amounts of sodium and soluble salts in the profile. The soils are dispersed and very hard when dry. Some soils have a thin loam surface layer. Because these soils tend to seal over when moistened they take in water very slowly. This range site is commonly intermingled with claypan range sites.

Gravel range site. This range site consists of very deep, excessively drained soils on stream terraces, hills, escarpments, and eskers. Slopes are 2 to 45 percent. The soils have a gravelly sandy loam surface layer and the underlying material is very cobbly to extremely gravelly loamy sand or sand. These soils take in water rapidly but are very droughty because of the low water holding capacity.

Saline upland range site. This range site typically consists of very deep, well drained soils on alluvial fans and stream terraces. Some soils are moderately well drained and are on flood plains. Slopes range from 0 to 15 percent. The soils have a clay loam to clay surface layer and the underlying material is loam to clay. The profile has high amounts of soluble salts and sodium. Permeability is slow or very slow. The majority of the vegetation is salt-tolerant plants.

Forest Land Understory Vegetation

Understory vegetation consists of grasses, forbs, shrubs, and other plants. If well managed, some forest land can produce enough understory vegetation to support grazing of livestock or wildlife, or both, without damage to the trees.

The quantity and quality of understory vegetation vary with the kind of soil, the age and kind of trees in the canopy, the density of the canopy, and the depth and condition of the litter. The density of the canopy determines the amount of light that understory plants receive.

The table "Understory Vegetation and Habitat Types" at the end of this section shows, for each soil suitable for forest land, the potential for producing understory vegetation. The *total production* of understory vegetation includes the herbaceous plants and the leaves, twigs, and fruit of woody plants up to a height of 4.5 feet. It is expressed in pounds per acre of air-dry vegetation in favorable, normal, and unfavorable years.

In a favorable year, soil moisture is above average during the optimal part of the growing season; in a normal year, soil moisture is average; and in an unfavorable year, it is below average.

The table also lists the common names of the *characteristic vegetation* on each soil and the *composition*, by percentage of air-dry weight, of each kind of plant. The table shows the kind and percentage of understory plants expected under a canopy density that is most nearly typical of forest land in which the production of wood crops is highest. The *representative habitat type* is an aggregation of all land areas potentially capable of producing similar plant communities at climax.

The first named habitat type listed in the table is from "Forest Habitat Types of Montana" (Pfister, et al., 1977), and subsequent types are from "Rocky Boy's Indian Reservation Forest Habitat Type Studies" (Roberts, Robert D. and Sibbernsen, John I., 1979).

Rangeland Productivity and Characteristic Plant Communities

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
2B:					
Marcott-----	Saline lowland, 15 to 19 inch	Favorable	3,000	Alkali sacaton-----	30
	Ppt zone, Northern Rocky	Normal	2,400	Western wheatgrass-----	20
	Mountain foothills, central	Unfavorable	1,700	Inland saltgrass-----	10
				Greasewood-----	5
				Nuttall saltbush-----	5
12C:					
Beaverton-----	Shallow to gravel, 15 to 19	Favorable	1,600	Bluebunch wheatgrass-----	40
	inch Ppt zone, Northern Rocky	Normal	1,300	Rough fescue-----	20
	Mountain foothills, central	Unfavorable	900	Idaho fescue-----	10
				Western wheatgrass-----	5
				Needleandthread-----	5
Beaverton-----	Shallow to gravel, 15 to 19	Favorable	1,600	Bluebunch wheatgrass-----	40
	inch Ppt zone, Northern Rocky	Normal	1,300	Rough fescue-----	20
	Mountain foothills, central	Unfavorable	900	Idaho fescue-----	10
				Western wheatgrass-----	5
				Needleandthread-----	5
13C:					
Tanna-----	Clayey, 10 to 14 inch Ppt zone,	Favorable	1,800	Western wheatgrass-----	30
	glaciated plains, North	Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Big sagebrush-----	5
				Winterfat-----	5
15E:					
Lambeth-----	Thin silty, 10 to 14 inch Ppt	Favorable	1,400	Bluebunch wheatgrass-----	35
	zone, glaciated plains, North	Normal	1,100	Western wheatgrass-----	20
		Unfavorable	800	Needleandthread-----	15
				Green needlegrass-----	10
				Plains muhly-----	5
15F:					
Lambeth-----	Thin silty, 10 to 14 inch Ppt	Favorable	1,400	Bluebunch wheatgrass-----	35
	zone, glaciated plains, North	Normal	1,100	Western wheatgrass-----	20
		Unfavorable	800	Needleandthread-----	15
				Green needlegrass-----	10
				Plains muhly-----	5
16B:					
Degradand-----	Silty, 10 to 14 inch Ppt zone,	Favorable	1,800	Bluebunch wheatgrass-----	30
	glaciated plains, North	Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
17B:					
Delpoint-----	Silty, 10 to 14 inch Ppt zone,	Favorable	1,800	Bluebunch wheatgrass-----	30
	glaciated plains, North	Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
21E:					
Cabbart-----	Shallow, 10 to 14 inch Ppt	Favorable	1,100	Bluebunch wheatgrass-----	50
	zone, glaciated plains, North	Normal	900	Western wheatgrass-----	15
		Unfavorable	600	Needleandthread-----	10
				Prairie junegrass-----	5
				Skunkbush sumac-----	5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
21E: (cont.)					
Delpoint-----	Thin silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,400	Bluebunch wheatgrass-----	35
		Normal	1,100	Western wheatgrass-----	20
		Unfavorable	800	Needleandthread-----	15
				Green needlegrass-----	10
				Plains muhly-----	5
22F:					
Hillon-----	Thin silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,400	Bluebunch wheatgrass-----	35
		Normal	1,100	Western wheatgrass-----	20
		Unfavorable	800	Needleandthread-----	15
				Green needlegrass-----	10
				Plains muhly-----	5
27B:					
Attewan-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
28:					
Nishon-----	Overflow, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	3,000	Basin wildrye-----	25
		Normal	2,500	Western wheatgrass-----	15
		Unfavorable	2,000	Green needlegrass-----	15
				Sedge-----	10
				Columbia needlegrass-----	10
				Rough fescue-----	5
				Slender wheatgrass-----	5
30B:					
Marvan-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Western wheatgrass-----	30
		Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Big sagebrush-----	5
				Winterfat-----	5
30C:					
Marvan-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Western wheatgrass-----	30
		Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Big sagebrush-----	5
				Winterfat-----	5
31A:					
Ferd-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
32B:					
Kobase-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Western wheatgrass-----	30
		Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Big sagebrush-----	5
				Winterfat-----	5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
32C:					
Kobase-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Western wheatgrass-----	30
		Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Big sagebrush-----	5
				Winterfat-----	5
32D:					
Kobase-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Western wheatgrass-----	30
		Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Big sagebrush-----	5
				Winterfat-----	5
33A:					
Phillips-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Green needlegrass-----	20
		Unfavorable	1,000	Needleandthread-----	15
34A:					
Linnet-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Western wheatgrass-----	30
		Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Big sagebrush-----	5
				Winterfat-----	5
35B:					
Assinniboine----	Sandy, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	2,000	Prairie sandreed-----	35
		Normal	1,500	Needleandthread-----	20
		Unfavorable	1,000	Bluebunch wheatgrass-----	15
				Western wheatgrass-----	10
				Indian ricegrass-----	10
36B:					
Chinook-----	Sandy, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	2,000	Prairie sandreed-----	35
		Normal	1,500	Needleandthread-----	20
		Unfavorable	1,000	Bluebunch wheatgrass-----	15
				Western wheatgrass-----	10
				Indian ricegrass-----	10
36C:					
Chinook-----	Sandy, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	2,000	Prairie sandreed-----	35
		Normal	1,500	Needleandthread-----	20
		Unfavorable	1,000	Bluebunch wheatgrass-----	15
				Western wheatgrass-----	10
				Indian ricegrass-----	10
37B:					
Evanston-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
37C:					
Evanston-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
38B:					
Ethridge-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Western wheatgrass-----	30
		Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Winterfat-----	15
				Big sagebrush-----	5
39B:					
Assinniboine----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
43A:					
Pendroy-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Western wheatgrass-----	30
		Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Big sagebrush-----	5
				Winterfat-----	5
44B:					
Kevin-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
47B:					
Marias-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Western wheatgrass-----	30
		Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Big sagebrush-----	5
				Winterfat-----	5
47C:					
Marias-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Western wheatgrass-----	30
		Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Big sagebrush-----	5
				Winterfat-----	5
48A:					
Vanda-----	Dense clay, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	800	Western wheatgrass-----	40
		Normal	500	Green needlegrass-----	20
		Unfavorable	300	Canby bluegrass-----	10
				Nuttall saltbush-----	5
				Winterfat-----	5
				Greasewood-----	5
48C:					
Vanda-----	Dense clay, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	800	Western wheatgrass-----	40
		Normal	500	Green needlegrass-----	20
		Unfavorable	300	Canby bluegrass-----	10
				Nuttall saltbush-----	5
				Winterfat-----	5
				Greasewood-----	5
50A:					
Telstad-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
55B:					
Lihen-----	Sands, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	2,200	Prairie sandreed-----	40
		Normal	1,700	Indian ricegrass-----	20
		Unfavorable	1,200	Needleandthread-----	10
				Sand dropseed-----	5
56A:					
Scobey-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
57B:					
Absarokee-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,600	Bluebunch wheatgrass-----	30
		Normal	2,200	Rough fescue-----	20
		Unfavorable	1,800	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
57C:					
Absarokee-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,600	Bluebunch wheatgrass-----	30
		Normal	2,200	Rough fescue-----	20
		Unfavorable	1,800	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
57E:					
Absarokee-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,600	Bluebunch wheatgrass-----	30
		Normal	2,200	Rough fescue-----	20
		Unfavorable	1,800	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
Reeder-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,600	Bluebunch wheatgrass-----	30
		Normal	2,200	Rough fescue-----	20
		Unfavorable	1,800	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
58B:					
Lonna-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Western wheatgrass-----	30
		Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Big sagebrush-----	5
				Winterfat-----	5
58C:					
Lonna-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Western wheatgrass-----	30
		Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Big sagebrush-----	5
				Winterfat-----	5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
60A:					
Havre-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	25
		Normal	1,400	Western wheatgrass-----	15
		Unfavorable	1,000	Needleandthread-----	15
				Green needlegrass-----	10
				Common snowberry-----	5
				Slender wheatgrass-----	5
				Canada wildrye-----	5
67B:					
Bearpaw-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,200	Bluebunch wheatgrass-----	30
		Normal	1,800	Rough fescue-----	20
		Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
67C:					
Bearpaw-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,200	Bluebunch wheatgrass-----	30
		Normal	1,800	Rough fescue-----	20
		Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
68B:					
Gerber-----	Clayey, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	2,100	Bluebunch wheatgrass-----	30
		Normal	1,700	Rough fescue-----	20
		Unfavorable	1,300	Western wheatgrass-----	10
				Idaho fescue-----	10
				Green needlegrass-----	10
				Lupine-----	5
				Columbia needlegrass-----	5
				Big sagebrush-----	5
69C:					
Vida-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,200	Bluebunch wheatgrass-----	30
		Normal	1,800	Rough fescue-----	20
		Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
Zahill-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,200	Bluebunch wheatgrass-----	30
		Normal	1,800	Rough fescue-----	20
		Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry		
			weight		
			Ib/acre		Pct
71D:					
Roy-----	Silty, 15 to 19 inch Ppt zone,	Favorable	2,000	Bluebunch wheatgrass-----	30
	Northern Rocky Mountain	Normal	1,600	Rough fescue-----	20
	foothills, Central	Unfavorable	1,200	Western wheatgrass-----	10
				Idaho fescue-----	10
				Big sagebrush-----	5
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
72F:					
Zahill-----	Thin silty, 15 to 19 inch Ppt	Favorable	1,800	Bluebunch wheatgrass-----	35
	zone, Northern Rocky Mountain	Normal	1,500	Rough fescue-----	20
	foothills, central	Unfavorable	1,100	Idaho fescue-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
73B:					
Yetull-----	Sands, 10 to 14 inch Ppt zone,	Favorable	2,200	Prairie sandreed-----	40
	glaciated plains, North	Normal	1,700	Indian ricegrass-----	20
		Unfavorable	1,200	Needleandthread-----	10
				Sand dropseed-----	5
	Lonesome-----	Favorable	2,200	Prairie sandreed-----	40
	Sands, 10 to 14 inch Ppt zone,	Normal	1,700	Indian ricegrass-----	20
	glaciated plains, North	Unfavorable	1,200	Needleandthread-----	10
				Sand dropseed-----	5
74C:					
Shambo-----	Silty, 15 to 19 inch Ppt zone,	Favorable	2,200	Bluebunch wheatgrass-----	30
	Northern Rocky Mountain	Normal	1,800	Rough fescue-----	20
	foothills, Central	Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
75B:					
Farnuf-----	Silty, 15 to 19 inch Ppt zone,	Favorable	2,200	Bluebunch wheatgrass-----	30
	Northern Rocky Mountain	Normal	1,800	Rough fescue-----	20
	foothills, Central	Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
75C:					
Farnuf-----	Silty, 15 to 19 inch Ppt zone,	Favorable	2,200	Bluebunch wheatgrass-----	30
	Northern Rocky Mountain	Normal	1,800	Rough fescue-----	20
	foothills, Central	Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
76C:					
Hedoes-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable Normal Unfavorable	2,600 2,200 1,700	Bluebunch wheatgrass----- Rough fescue----- Idaho fescue----- Western wheatgrass----- Columbia needlegrass----- Green needlegrass----- Needleandthread-----	30 20 10 10 5 5 5
77F:					
Tinsley-----	Gravel, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable Normal Unfavorable	800 600 400	Bluebunch wheatgrass----- Needleandthread----- Winterfat----- Western wheatgrass----- Plains muhly----- Yucca-----	35 15 10 10 10 5
79B:					
Yamacall-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable Normal Unfavorable	1,800 1,400 1,000	Bluebunch wheatgrass----- Western wheatgrass----- Green needlegrass----- Needleandthread-----	30 25 20 15
79C:					
Yamacall-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable Normal Unfavorable	1,800 1,400 1,000	Bluebunch wheatgrass----- Western wheatgrass----- Green needlegrass----- Needleandthread-----	30 25 20 15
79D:					
Yamacall-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable Normal Unfavorable	1,800 1,400 1,000	Bluebunch wheatgrass----- Western wheatgrass----- Green needlegrass----- Needleandthread-----	30 25 20 15
81A:					
Glendive-----	Sandy, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable Normal Unfavorable	2,000 1,500 1,000	Needleandthread----- Western wheatgrass----- Indian ricegrass----- Bluebunch wheatgrass----- Common snowberry-----	20 10 10 10 5
82B:					
Savage-----	Clayey, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable Normal Unfavorable	2,100 1,700 1,300	Bluebunch wheatgrass----- Rough fescue----- Idaho fescue----- Western wheatgrass----- Green needlegrass----- Columbia needlegrass----- Needleandthread-----	30 20 10 10 10 5 5
86B:					
Work-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable Normal Unfavorable	2,600 2,200 1,800	Bluebunch wheatgrass----- Rough fescue----- Idaho fescue----- Western wheatgrass----- Columbia needlegrass----- Green needlegrass----- Needleandthread-----	30 20 10 10 5 5 5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
86C:					
Work-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable Normal Unfavorable	2,600 2,200 1,800	Bluebunch wheatgrass----- Rough fescue----- Idaho fescue----- Western wheatgrass----- Columbia needlegrass----- Green needlegrass----- Needleandthread-----	30 20 10 10 5 5 5
86D:					
Work-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable Normal Unfavorable	2,600 2,200 1,800	Bluebunch wheatgrass----- Rough fescue----- Idaho fescue----- Western wheatgrass----- Columbia needlegrass----- Green needlegrass----- Needleandthread-----	30 20 10 10 5 5 5
87B:					
Tamaneen-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable Normal Unfavorable	2,600 2,200 1,700	Bluebunch wheatgrass----- Rough fescue----- Idaho fescue----- Western wheatgrass----- Columbia needlegrass----- Green needlegrass----- Needleandthread-----	30 20 10 10 5 5 5
88C:					
Perma-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable Normal Unfavorable	2,600 2,200 1,800	Bluebunch wheatgrass----- Rough fescue----- Idaho fescue----- Western wheatgrass----- Columbia needlegrass----- Green needlegrass----- Needleandthread-----	30 20 10 10 5 5 5
90A:					
Harlake-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable Normal Unfavorable	1,800 1,300 900	Green needlegrass----- Western wheatgrass----- Silver sagebrush-----	40 35 20
92E:					
Sunburst-----	Thin clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable Normal Unfavorable	1,400 1,100 800	Bluebunch wheatgrass----- Western wheatgrass----- Green needlegrass----- Plains muhly-----	30 15 15 5
Bascovy-----	Thin clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable Normal Unfavorable	1,400 1,100 800	Bluebunch wheatgrass----- Western wheatgrass----- Green needlegrass----- Plains muhly-----	30 15 15 5
93F:					
Yetull-----	Thin sandy, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable Normal Unfavorable	1,600 1,300 900	Prairie sandreed----- Needleandthread----- Indian ricegrass----- Bluebunch wheatgrass-----	30 20 10 10

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
94B:					
Busby-----	Sandy, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	2,000	Prairie sandreed-----	35
		Normal	1,500	Needleandthread-----	20
		Unfavorable	1,000	Bluebunch wheatgrass-----	15
				Western wheatgrass-----	10
				Indian ricegrass-----	10
94C:					
Busby-----	Sandy, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	2,000	Prairie sandreed-----	35
		Normal	1,500	Needleandthread-----	20
		Unfavorable	1,000	Bluebunch wheatgrass-----	15
				Western wheatgrass-----	10
				Indian ricegrass-----	10
94D:					
Busby-----	Sandy, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	2,000	Prairie sandreed-----	35
		Normal	1,500	Needleandthread-----	20
		Unfavorable	1,000	Bluebunch wheatgrass-----	15
				Western wheatgrass-----	10
				Indian ricegrass-----	10
96B:					
Macar-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,200	Bluebunch wheatgrass-----	30
		Normal	1,800	Rough fescue-----	20
		Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
96C:					
Macar-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,200	Bluebunch wheatgrass-----	30
		Normal	1,800	Rough fescue-----	20
		Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
98B:					
Kremlin-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
98C:					
Kremlin-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
110C:					
Laceycreek-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,700	Rough fescue-----	25
		Normal	2,300	Columbia needlegrass-----	20
		Unfavorable	1,800	Bluebunch wheatgrass-----	15
				Idaho fescue-----	10

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
110D:					
Laceycreek-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable Normal Unfavorable	2,700 2,300 1,800	Rough fescue----- Columbia needlegrass----- Bluebunch wheatgrass----- Idaho fescue-----	25 20 15 10
110E:					
Laceycreek-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable Normal Unfavorable	2,700 2,300 1,800	Rough fescue----- Columbia needlegrass----- Bluebunch wheatgrass----- Idaho fescue-----	25 20 15 10
140A:					
Klayent-----	Subirrigated, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable Normal Unfavorable	6,000 5,000 4,000	Northern reedgrass----- Prairie cordgrass----- Tufted hairgrass----- Slender wheatgrass----- Western wheatgrass----- Sedge----- American manna grass-----	20 20 10 10 5 5 5
141B:					
Megonot-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable Normal Unfavorable	1,800 1,300 900	Western wheatgrass----- Green needlegrass----- Bluebunch wheatgrass----- Big sagebrush----- Winterfat-----	30 30 20 5 5
Weingart-----	Clay pan, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable Normal Unfavorable	1,200 900 600	Western wheatgrass----- Green needlegrass----- Winterfat----- Needleandthread----- Nuttall saltbush----- Big sagebrush-----	35 15 10 10 5 5
Delpoint-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable Normal Unfavorable	1,800 1,400 1,000	Bluebunch wheatgrass----- Western wheatgrass----- Green needlegrass----- Needleandthread-----	30 25 20 15
142C:					
Megonot-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable Normal Unfavorable	1,800 1,300 900	Western wheatgrass----- Green needlegrass----- Bluebunch wheatgrass----- Big sagebrush----- Winterfat-----	30 30 20 5 5
Kobase-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable Normal Unfavorable	1,800 1,300 900	Western wheatgrass----- Green needlegrass----- Bluebunch wheatgrass----- Big sagebrush----- Winterfat-----	30 30 20 5 5
Delpoint-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable Normal Unfavorable	1,800 1,400 1,000	Bluebunch wheatgrass----- Western wheatgrass----- Green needlegrass----- Needleandthread-----	30 25 20 15

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
160A:					
Big sandy-----	Subirrigated, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	5,000	Basin wildrye-----	25
		Normal	4,000	Tufted hairgrass-----	15
		Unfavorable	3,000	Northern reedgrass-----	10
				Prairie cordgrass-----	10
				Sedge-----	5
				Canada wildrye-----	5
				Slender wheatgrass-----	5
				Bearded wheatgrass-----	5
				Baltic rush-----	5
				Mat muhly-----	5
171C:					
Delpoint-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
Cabbart-----	Shallow, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,100	Bluebunch wheatgrass-----	50
		Normal	900	Western wheatgrass-----	15
		Unfavorable	600	Needleandthread-----	10
				Prairie junegrass-----	5
				Skunkbush sumac-----	5
180A:					
McIlwaine-----	Sandy, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	2,800	Prairie sandreed-----	25
		Normal	2,400	Bluebunch wheatgrass-----	20
		Unfavorable	2,000	Idaho fescue-----	10
				Needleandthread-----	10
				Rough fescue-----	10
				Columbia needlegrass-----	5
Nesda-----	Shallow to gravel, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	1,800	Bluebunch wheatgrass-----	40
		Normal	1,500	Rough fescue-----	20
		Unfavorable	1,100	Idaho fescue-----	10
				Western wheatgrass-----	5
				Needleandthread-----	5
Straw-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,600	Bluebunch wheatgrass-----	30
		Normal	2,200	Rough fescue-----	20
		Unfavorable	1,800	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
182F:					
Megonot-----	Thin clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,400	Bluebunch wheatgrass-----	30
		Normal	1,100	Western wheatgrass-----	15
		Unfavorable	800	Green needlegrass-----	15
				Plains muhly-----	5
Yawdim-----	Shallow clay, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,000	Bluebunch wheatgrass-----	50
		Normal	800	Western wheatgrass-----	20
		Unfavorable	500	Green needlegrass-----	10
				Plains muhly-----	5
				Needleandthread-----	5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
201F:					
Cabba-----	Shallow, 15 to 19 inch Ppt	Favorable	1,400	Bluebunch wheatgrass-----	30
	zone, Northern Rocky Mountain	Normal	1,200	Idaho fescue-----	20
	foothills, central	Unfavorable	900	Rough fescue-----	15
				Western wheatgrass-----	10
				Needleandthread-----	10
Wayden-----	Shallow clay, 15 to 19 inch Ppt	Favorable	1,300	Green needlegrass-----	20
	zone, Northern Rocky Mountain	Normal	1,100	Bluebunch wheatgrass-----	20
	foothills, central	Unfavorable	800	Western wheatgrass-----	15
				Idaho fescue-----	10
				Winterfat-----	5
				Plains muhly-----	5
210C:					
Shane-----	Clayey, 15 to 19 inch Ppt zone,	Favorable	2,500	Bluebunch wheatgrass-----	30
	Northern Rocky Mountain	Normal	2,100	Rough fescue-----	20
	foothills, central	Unfavorable	1,700	Western wheatgrass-----	10
				Idaho fescue-----	10
				Big sagebrush-----	5
				Lupine-----	5
				Columbia needlegrass-----	5
Gerber-----	Clayey, 15 to 19 inch Ppt zone,	Favorable	2,500	Bluebunch wheatgrass-----	30
	Northern Rocky Mountain	Normal	2,100	Rough fescue-----	20
	foothills, central	Unfavorable	1,700	Western wheatgrass-----	10
				Idaho fescue-----	10
				Big sagebrush-----	5
				Lupine-----	5
				Columbia needlegrass-----	5
210E:					
Shane-----	Clayey, 15 to 19 inch Ppt zone,	Favorable	2,500	Bluebunch wheatgrass-----	30
	Northern Rocky Mountain	Normal	2,100	Rough fescue-----	20
	foothills, central	Unfavorable	1,700	Western wheatgrass-----	10
				Idaho fescue-----	10
				Big sagebrush-----	5
				Lupine-----	5
				Columbia needlegrass-----	5
Barkof-----	Clayey, 15 to 19 inch Ppt zone,	Favorable	2,500	Bluebunch wheatgrass-----	30
	Northern Rocky Mountain	Normal	2,100	Rough fescue-----	20
	foothills, central	Unfavorable	1,700	Western wheatgrass-----	10
				Idaho fescue-----	10
				Big sagebrush-----	5
				Lupine-----	5
				Columbia needlegrass-----	5
Gerber-----	Clayey, 15 to 19 inch Ppt zone,	Favorable	2,500	Bluebunch wheatgrass-----	30
	Northern Rocky Mountain	Normal	2,100	Rough fescue-----	20
	foothills, central	Unfavorable	1,700	Western wheatgrass-----	10
				Idaho fescue-----	10
				Big sagebrush-----	5
				Lupine-----	5
				Columbia needlegrass-----	5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry		
			weight		
			Lb/acre		Pct
211F:					
Cabbart-----	Shallow, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,100	Bluebunch wheatgrass-----	50
		Normal	900	Western wheatgrass-----	15
		Unfavorable	600	Needleandthread-----	10
				Prairie junegrass-----	5
				Skunkbush sumac-----	5
Yawdim-----	Shallow clay, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,000	Bluebunch wheatgrass-----	50
		Normal	800	Western wheatgrass-----	20
		Unfavorable	500	Needleandthread-----	15
				Green needlegrass-----	10
				Plains muhly-----	5
212F:					
Cabbart-----	Shallow, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,100	Bluebunch wheatgrass-----	50
		Normal	900	Western wheatgrass-----	15
		Unfavorable	600	Needleandthread-----	10
				Prairie junegrass-----	5
				Skunkbush sumac-----	5
Hillon-----	Thin silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,400	Bluebunch wheatgrass-----	35
		Normal	1,100	Western wheatgrass-----	20
		Unfavorable	800	Needleandthread-----	15
				Green needlegrass-----	10
				Plains muhly-----	5
221E:					
Hillon-----	Thin silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,400	Bluebunch wheatgrass-----	35
		Normal	1,100	Western wheatgrass-----	20
		Unfavorable	800	Needleandthread-----	15
				Green needlegrass-----	10
				Plains muhly-----	5
Kevin-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
222D:					
Hillon-----	Thin silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,400	Bluebunch wheatgrass-----	35
		Normal	1,100	Western wheatgrass-----	20
		Unfavorable	800	Needleandthread-----	15
				Green needlegrass-----	10
				Plains muhly-----	5
Delpoint-----	Thin silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,400	Bluebunch wheatgrass-----	35
		Normal	1,100	Western wheatgrass-----	20
		Unfavorable	800	Needleandthread-----	15
				Green needlegrass-----	10
				Plains muhly-----	5
223E:					
Hillon-----	Thin silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,400	Bluebunch wheatgrass-----	35
		Normal	1,100	Western wheatgrass-----	20
		Unfavorable	800	Needleandthread-----	15
				Green needlegrass-----	10
				Plains muhly-----	5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
223E: (cont.)					
Fleak-----	Shallow, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,100	Bluebunch wheatgrass-----	50
		Normal	900	Prairie sandreed-----	20
		Unfavorable	600	Western wheatgrass-----	10
				Needleandthread-----	10
224E:					
Hillon-----	Thin silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,400	Bluebunch wheatgrass-----	35
		Normal	1,100	Western wheatgrass-----	20
		Unfavorable	800	Needleandthread-----	15
				Green needlegrass-----	10
				Plains muhly-----	5
Joplin-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
227F:					
Hillon-----	Thin silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,400	Bluebunch wheatgrass-----	35
		Normal	1,100	Western wheatgrass-----	20
		Unfavorable	800	Needleandthread-----	15
				Green needlegrass-----	10
				Plains muhly-----	5
Fleak-----	Shallow, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,100	Bluebunch wheatgrass-----	50
		Normal	900	Prairie sandreed-----	20
		Unfavorable	600	Western wheatgrass-----	10
				Needleandthread-----	10
229E:					
Hillon-----	Thin silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,400	Bluebunch wheatgrass-----	35
		Normal	1,100	Western wheatgrass-----	20
		Unfavorable	800	Needleandthread-----	15
				Green needlegrass-----	10
				Plains muhly-----	5
Lambeth-----	Thin silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,400	Bluebunch wheatgrass-----	35
		Normal	1,100	Western wheatgrass-----	20
		Unfavorable	800	Needleandthread-----	15
				Green needlegrass-----	10
				Plains muhly-----	5
232A:					
Acel-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Western wheatgrass-----	30
		Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Big sagebrush-----	5
				Winterfat-----	5
251C:					
Basconvy-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Western wheatgrass-----	30
		Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Big sagebrush-----	5
				Winterfat-----	5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry		
			weight		
			Lb/acre		Pct
251C: (cont.)					
Neldore-----	Shallow clay, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,000	Bluebunch wheatgrass-----	50
		Normal	800	Western wheatgrass-----	20
		Unfavorable	500	Green needlegrass-----	10
				Plains muhly-----	5
				Needleandthread-----	5
251E:					
Bascovy-----	Thin clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,400	Bluebunch wheatgrass-----	30
		Normal	1,100	Western wheatgrass-----	15
		Unfavorable	800	Green needlegrass-----	15
				Plains muhly-----	5
Neldore-----	Shallow clay, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,000	Bluebunch wheatgrass-----	50
		Normal	800	Western wheatgrass-----	20
		Unfavorable	500	Green needlegrass-----	10
				Plains muhly-----	5
				Needleandthread-----	5
252C:					
Bascovy-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Western wheatgrass-----	30
		Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Big sagebrush-----	5
				Winterfat-----	5
Marvan-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Western wheatgrass-----	30
		Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Big sagebrush-----	5
				Winterfat-----	5
261B:					
Absher-----	Dense clay, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	800	Western wheatgrass-----	40
		Normal	600	Green needlegrass-----	20
		Unfavorable	400	Canby bluegrass-----	10
				Nuttall saltbush-----	5
				Winterfat-----	5
				Greasewood-----	5
Nobe-----	Saline upland, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	500	Western wheatgrass-----	40
		Normal	300	Alkali sacaton-----	15
		Unfavorable	200	Inland saltgrass-----	15
				Nuttall saltbush-----	5
				Greasewood-----	5
263A:					
Toston-----	Saline lowland, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	3,000	Alkali sacaton-----	30
		Normal	2,300	Inland saltgrass-----	15
		Unfavorable	1,700	Western wheatgrass-----	15
				Other perennial grasses-----	10
				Greasewood-----	10
				Other perennial forbs-----	5
				Alkali bluegrass-----	5
				Fourwing saltbush-----	5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
264A:					
Toston-----	Saline lowland, 10 to 14 inch	Favorable	3,000	Alkali sacaton-----	30
	Ppt zone, glaciated plains,	Normal	2,300	Inland saltgrass-----	15
	North	Unfavorable	1,700	Western wheatgrass-----	15
				Other perennial grasses-----	10
				Greasewood-----	10
				Other perennial forbs-----	5
				Alkali bluegrass-----	5
				Fourwing saltbush-----	5
Nobe-----	Saline upland, 10 to 14 inch	Favorable	500	Western wheatgrass-----	40
	Ppt zone, glaciated plains,	Normal	300	Alkali sacaton-----	15
	North	Unfavorable	200	Nuttall alkaligrass-----	15
				Inland saltgrass-----	10
				Alkali cordgrass-----	10
				Greasewood-----	10
				Slender wheatgrass-----	5
				Other perennial forbs-----	5
				Fourwing saltbush-----	5
265B:					
Absher-----	Dense clay, 10 to 14 inch Ppt	Favorable	800	Western wheatgrass-----	40
	zone, glaciated plains, North	Normal	600	Green needlegrass-----	20
		Unfavorable	400	Canby bluegrass-----	10
				Nuttall saltbush-----	5
				Winterfat-----	5
				Greasewood-----	5
Gerdum-----	Clay pan, 10 to 14 inch Ppt	Favorable	1,200	Western wheatgrass-----	35
	zone, glaciated plains, North	Normal	900	Green needlegrass-----	15
		Unfavorable	600	Winterfat-----	10
				Needleandthread-----	10
				Nuttall saltbush-----	5
				Big sagebrush-----	5
272C:					
Attewan-----	Silty, 10 to 14 inch Ppt zone,	Favorable	1,800	Bluebunch wheatgrass-----	30
	glaciated plains, North	Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
Tinsley-----	Gravel, 10 to 14 inch Ppt zone,	Favorable	800	Bluebunch wheatgrass-----	35
	glaciated plains, North	Normal	600	Needleandthread-----	15
		Unfavorable	400	Winterfat-----	10
				Western wheatgrass-----	10
				Plains muhly-----	10
				Yucca-----	5
301A:					
Marvan-----	Clayey, 10 to 14 inch Ppt zone,	Favorable	1,800	Western wheatgrass-----	30
	glaciated plains, North	Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Big sagebrush-----	5
				Winterfat-----	5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
301A: (cont.)					
Vanda-----	Dense clay, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	800	Western wheatgrass-----	40
		Normal	500	Green needlegrass-----	20
		Unfavorable	300	Canby bluegrass-----	10
				Nuttall saltbush-----	5
				Winterfat-----	5
				Greasewood-----	5
301C:					
Marvan-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Western wheatgrass-----	30
		Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Big sagebrush-----	5
				Winterfat-----	5
Vanda-----	Dense clay, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	800	Western wheatgrass-----	40
		Normal	500	Green needlegrass-----	20
		Unfavorable	300	Canby bluegrass-----	10
				Nuttall saltbush-----	5
				Winterfat-----	5
				Greasewood-----	5
303A:					
Flatcreek-----	Saline upland, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	500	Western wheatgrass-----	30
		Normal	300	Alkali sacaton-----	15
		Unfavorable	200	Inland saltgrass-----	10
				Alkali bluegrass-----	5
				Fourwing saltbush-----	5
				Other perennial forbs-----	5
				Other perennial grasses-----	5
				Greasewood-----	5
Nobe-----	Saline lowland, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,100	Western wheatgrass-----	40
		Normal	900	Inland saltgrass-----	15
		Unfavorable	700	Nuttall alkaligrass-----	15
				Alkali sacaton-----	10
				Alkali cordgrass-----	10
				Greasewood-----	10
				Slender wheatgrass-----	5
				Other perennial forbs-----	5
				Fourwing saltbush-----	5
305A:					
Marvan-----	Dense clay, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,000	Western wheatgrass-----	40
		Normal	700	Green needlegrass-----	20
		Unfavorable	500	Canby bluegrass-----	10
				Nuttall saltbush-----	5
				Winterfat-----	5
				Greasewood-----	5
Nobe-----	Saline upland, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	500	Western wheatgrass-----	40
		Normal	300	Alkali sacaton-----	15
		Unfavorable	200	Inland saltgrass-----	15
				Nuttall saltbush-----	5
				Greasewood-----	5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
311B:					
Ferd-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
Creed-----	Clay pan, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,500	Western wheatgrass-----	35
		Normal	1,200	Green needlegrass-----	15
		Unfavorable	800	Winterfat-----	10
				Needleandthread-----	10
				Nuttall saltbush-----	5
				Big sagebrush-----	5
Gerdum-----	Clay pan, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,200	Western wheatgrass-----	35
		Normal	900	Green needlegrass-----	15
		Unfavorable	600	Winterfat-----	10
				Needleandthread-----	10
				Nuttall saltbush-----	5
				Big sagebrush-----	5
311C:					
Ferd-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
Creed-----	Clay pan, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,500	Western wheatgrass-----	35
		Normal	1,200	Green needlegrass-----	15
		Unfavorable	800	Winterfat-----	10
				Needleandthread-----	10
				Nuttall saltbush-----	5
				Big sagebrush-----	5
Gerdum-----	Clay pan, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,200	Western wheatgrass-----	35
		Normal	900	Green needlegrass-----	15
		Unfavorable	600	Winterfat-----	10
				Needleandthread-----	10
				Nuttall saltbush-----	5
				Big sagebrush-----	5
323B:					
Sagedale-----	Clayey, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	2,100	Bluebunch wheatgrass-----	30
		Normal	1,700	Rough fescue-----	20
		Unfavorable	1,300	Western wheatgrass-----	10
				Idaho fescue-----	10
				Green needlegrass-----	10
				Lupine-----	5
				Columbia needlegrass-----	5
				Big sagebrush-----	5
323C:					
Sagedale-----	Clayey, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	2,100	Bluebunch wheatgrass-----	30
		Normal	1,700	Rough fescue-----	20
		Unfavorable	1,300	Western wheatgrass-----	10
				Idaho fescue-----	10
				Green needlegrass-----	10
				Lupine-----	5
				Columbia needlegrass-----	5
				Big sagebrush-----	5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry		
			weight		
			Lb/acre		Pct
324B:					
Marcott-----	Subirrigated, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	6,000	Sedge-----	20
		Normal	5,000	Prairie cordgrass-----	20
		Unfavorable	4,000	Tufted hairgrass-----	10
				Slender wheatgrass-----	10
				Bearded wheatgrass-----	5
				American mannagrass-----	5
331B:					
Phillips-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
Elloam-----	Clay pan, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,200	Western wheatgrass-----	35
		Normal	900	Green needlegrass-----	15
		Unfavorable	600	Winterfat-----	10
				Needleandthread-----	10
				Big sagebrush-----	5
331C:					
Phillips-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
Elloam-----	Clay pan, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,200	Western wheatgrass-----	35
		Normal	900	Green needlegrass-----	15
		Unfavorable	600	Winterfat-----	10
				Needleandthread-----	10
				Big sagebrush-----	5
334B:					
Phillips-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
Kevin-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
341B:					
Linnet-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Western wheatgrass-----	30
		Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Big sagebrush-----	5
				Winterfat-----	5
Marias-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Western wheatgrass-----	30
		Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Big sagebrush-----	5
				Winterfat-----	5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
351B:					
Kenilworth-----	Sandy, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	2,000	Prairie sandreed-----	35
		Normal	1,500	Needleandthread-----	20
		Unfavorable	1,000	Bluebunch wheatgrass-----	15
				Western wheatgrass-----	10
				Indian ricegrass-----	10
Fortbenton-----	Sandy, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	2,000	Prairie sandreed-----	35
		Normal	1,500	Needleandthread-----	20
		Unfavorable	1,000	Bluebunch wheatgrass-----	15
				Western wheatgrass-----	10
				Indian ricegrass-----	10
361B:					
Fortbenton-----	Sandy, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	2,000	Prairie sandreed-----	35
		Normal	1,500	Needleandthread-----	20
		Unfavorable	1,000	Bluebunch wheatgrass-----	15
				Western wheatgrass-----	10
				Indian ricegrass-----	10
362C:					
Chinook-----	Sandy, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	2,000	Prairie sandreed-----	35
		Normal	1,500	Needleandthread-----	20
		Unfavorable	1,000	Bluebunch wheatgrass-----	15
				Western wheatgrass-----	10
				Indian ricegrass-----	10
Yetull-----	Sands, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	2,200	Prairie sandreed-----	40
		Normal	1,700	Indian ricegrass-----	20
		Unfavorable	1,200	Needleandthread-----	10
				Sand dropseed-----	5
363B:					
Cozberg-----	Sandy, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	2,000	Prairie sandreed-----	35
		Normal	1,500	Needleandthread-----	20
		Unfavorable	1,000	Bluebunch wheatgrass-----	15
				Western wheatgrass-----	10
				Indian ricegrass-----	10
Chinook-----	Sandy, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	2,000	Prairie sandreed-----	35
		Normal	1,500	Needleandthread-----	20
		Unfavorable	1,000	Bluebunch wheatgrass-----	15
				Western wheatgrass-----	10
				Indian ricegrass-----	10
363C:					
Chinook-----	Sandy, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	2,000	Prairie sandreed-----	35
		Normal	1,500	Needleandthread-----	20
		Unfavorable	1,000	Bluebunch wheatgrass-----	15
				Western wheatgrass-----	10
				Indian ricegrass-----	10
Lihen-----	Sandy, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	2,000	Prairie sandreed-----	35
		Normal	1,500	Needleandthread-----	20
		Unfavorable	1,000	Bluebunch wheatgrass-----	15
				Western wheatgrass-----	10
				Indian ricegrass-----	10

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Ib/acre		Pct
364B:					
Chinook-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
364C:					
Chinook-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
365B:					
Fortbenton-----	Sandy, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	2,000	Prairie sandreed-----	35
		Normal	1,500	Needleandthread-----	20
		Unfavorable	1,000	Bluebunch wheatgrass-----	15
				Western wheatgrass-----	10
				Indian ricegrass-----	10
Chinook-----	Sandy, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	2,000	Prairie sandreed-----	35
		Normal	1,500	Needleandthread-----	20
		Unfavorable	1,000	Bluebunch wheatgrass-----	15
				Western wheatgrass-----	10
				Indian ricegrass-----	10
368C:					
Fortbenton-----	Sandy, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	2,000	Prairie sandreed-----	35
		Normal	1,500	Needleandthread-----	20
		Unfavorable	1,000	Bluebunch wheatgrass-----	15
				Western wheatgrass-----	10
				Indian ricegrass-----	10
Hillon-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
372C:					
Evanston-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
Yamacall-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
375B:					
Evanston-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
Lonna-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
377B:					
Evanston-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
Degrad-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
381B:					
Ethridge-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Western wheatgrass-----	30
		Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Winterfat-----	15
				Big sagebrush-----	5
385B:					
Ethridge-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Western wheatgrass-----	30
		Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Winterfat-----	15
				Big sagebrush-----	5
Kobase-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Western wheatgrass-----	30
		Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Big sagebrush-----	5
				Winterfat-----	5
386B:					
Ethridge-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Western wheatgrass-----	30
		Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Winterfat-----	15
				Big sagebrush-----	5
Evanston-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
388A:					
Ethridge-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Western wheatgrass-----	30
		Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Winterfat-----	15
				Big sagebrush-----	5
Lonna-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Western wheatgrass-----	30
		Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Big sagebrush-----	5
				Winterfat-----	5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry		
			weight		
			Lb/acre		Pct
402A:					
Gerdrum-----	Clay pan, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,200	Western wheatgrass-----	35
		Normal	900	Green needlegrass-----	15
		Unfavorable	600	Winterfat-----	10
				Needleandthread-----	10
				Nuttall saltbush-----	5
				Big sagebrush-----	5
Absher-----	Dense clay, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	600	Western wheatgrass-----	40
		Normal	400	Green needlegrass-----	20
		Unfavorable	300	Canby bluegrass-----	10
				Nuttall saltbush-----	5
				Winterfat-----	5
				Greasewood-----	5
Creed-----	Clay pan, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,500	Western wheatgrass-----	35
		Normal	1,200	Green needlegrass-----	15
		Unfavorable	800	Winterfat-----	10
				Needleandthread-----	10
				Nuttall saltbush-----	5
				Big sagebrush-----	5
411D:					
Farnuf-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,600	Bluebunch wheatgrass-----	30
		Normal	2,200	Rough fescue-----	20
		Unfavorable	1,800	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
Reeder-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,600	Bluebunch wheatgrass-----	30
		Normal	2,200	Rough fescue-----	20
		Unfavorable	1,800	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
411E:					
Reeder-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,600	Bluebunch wheatgrass-----	30
		Normal	2,200	Rough fescue-----	20
		Unfavorable	1,800	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
Farnuf-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,600	Bluebunch wheatgrass-----	30
		Normal	2,200	Rough fescue-----	20
		Unfavorable	1,800	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
421C:					
Joplin-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
Hillon-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
422C:					
Marmarth-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
441C:					
Kevin-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
Hillon-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
442C:					
Kevin-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
Elloam-----	Clay pan, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,200	Western wheatgrass-----	45
		Normal	900	Green needlegrass-----	15
		Unfavorable	600	Winterfat-----	10
				Needleandthread-----	10
				Big sagebrush-----	5
444D:					
Kevin-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
Scobey-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
451C:					
Turner-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,200	Bluebunch wheatgrass-----	30
		Normal	1,800	Rough fescue-----	20
		Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
451C: (cont.)					
Beaverton-----	Shallow to gravel, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	1,600	Bluebunch wheatgrass-----	40
		Normal	1,300	Rough fescue-----	20
		Unfavorable	900	Idaho fescue-----	10
				Western wheatgrass-----	5
				Needleandthread-----	5
Beaverton-----	Shallow to gravel, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	1,600	Bluebunch wheatgrass-----	40
		Normal	1,300	Rough fescue-----	20
		Unfavorable	900	Idaho fescue-----	10
				Western wheatgrass-----	5
				Needleandthread-----	5
471B:					
Marias-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Western wheatgrass-----	30
		Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Big sagebrush-----	5
				Winterfat-----	5
Kobase-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Western wheatgrass-----	30
		Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Big sagebrush-----	5
				Winterfat-----	5
481A:					
Bigsag-----	Saline lowland, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	2,400	Alkali sacaton-----	30
		Normal	1,800	Western wheatgrass-----	20
		Unfavorable	1,200	Inland saltgrass-----	10
				Nuttall saltbush-----	5
				Sedge-----	5
493A:	Enbar-----	Favorable	5,500	Prairie cordgrass-----	20
				Northern reedgrass-----	20
		Normal	5,000	Other shrubs-----	10
				Slender wheatgrass-----	10
		Unfavorable	4,000	Deca5**-----	10
				Sedge-----	5
				Other perennial grasses-----	5
				American mannagrass-----	5
				Bearded wheatgrass-----	5
Straw-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,200	Bluebunch wheatgrass-----	40
		Normal	1,800	Rough fescue-----	20
		Unfavorable	1,400	Idaho fescue-----	10
				Lupine-----	10
				Other shrubs-----	7
				Western wheatgrass-----	5
				Other perennial grasses-----	5
				Needleandthread-----	5
				Columbia needlegrass-----	5
				Other perennial forbs-----	1

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
493A: (cont.)					
Eagleton-----	Subirrigated, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	6,000	Basin wildrye-----	25
		Normal	5,000	Deca5**-----	15
		Unfavorable	4,000	Prairie cordgrass-----	10
				Northern reedgrass-----	10
				Bearded wheatgrass-----	5
				Canada wildrye-----	5
				Other shrubs-----	5
				Sedge-----	5
				Baltic rush-----	5
				Other perennial forbs-----	5
				Slender wheatgrass-----	5
503B:					
Telstad-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
Joplin-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
503C:					
Telstad-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
Joplin-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
511A:					
Martinsdale----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,200	Bluebunch wheatgrass-----	30
		Normal	1,800	Rough fescue-----	20
		Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
Turner-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,200	Bluebunch wheatgrass-----	30
		Normal	1,800	Rough fescue-----	20
		Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
511C:					
Martinsdale----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,200	Bluebunch wheatgrass-----	30
		Normal	1,800	Rough fescue-----	20
		Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry		
			weight		
			Lb/acre		Pct
512C:					
Martinsdale-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable Normal Unfavorable	2,600 2,200 1,800	Bluebunch wheatgrass----- Rough fescue----- Idaho fescue----- Western wheatgrass----- Needleandthread----- Green needlegrass-----	30 20 10 10 5 5
521B:					
Thoeny-----	Clay pan, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable Normal Unfavorable	1,400 1,000 700	Western wheatgrass----- Green needlegrass----- Winterfat----- Needleandthread----- Nuttall saltbush----- Big sagebrush-----	35 15 10 10 5 5
Elloam-----	Clay pan, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable Normal Unfavorable	1,200 900 600	Western wheatgrass----- Green needlegrass----- Winterfat----- Needleandthread----- Greasewood----- Nuttall saltbush-----	40 15 10 10 5 5
Absher-----	Dense clay, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable Normal Unfavorable	600 400 300	Western wheatgrass----- Green needlegrass----- Canby bluegrass----- Nuttall saltbush----- Winterfat----- Greasewood-----	35 20 10 5 5 5
531A:					
Sweetgrass-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable Normal Unfavorable	2,200 1,800 1,400	Bluebunch wheatgrass----- Rough fescue----- Idaho fescue----- Western wheatgrass----- Columbia needlegrass----- Green needlegrass----- Needleandthread-----	30 20 10 10 5 5 5
Beaverton-----	Shallow to gravel, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable Normal Unfavorable	1,600 1,300 900	Bluebunch wheatgrass----- Rough fescue----- Idaho fescue----- Western wheatgrass----- Needleandthread-----	40 20 10 5 5
531C:					
Sweetgrass-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable Normal Unfavorable	2,200 1,800 1,400	Bluebunch wheatgrass----- Rough fescue----- Idaho fescue----- Western wheatgrass----- Columbia needlegrass----- Green needlegrass----- Needleandthread-----	30 20 10 10 5 5 5
Beaverton-----	Shallow to gravel, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable Normal Unfavorable	1,600 1,300 900	Bluebunch wheatgrass----- Rough fescue----- Idaho fescue----- Western wheatgrass----- Needleandthread-----	40 20 10 5 5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Ib/acre		Pct
531C: (cont.)					
Beaverton-----	Shallow to gravel, 15 to 19	Favorable	1,600	Bluebunch wheatgrass-----	40
	inch Ppt zone, Northern Rocky	Normal	1,300	Rough fescue-----	20
	Mountain foothills, central	Unfavorable	900	Idaho fescue-----	10
				Western wheatgrass-----	5
				Needleandthread-----	5
550F:					
Libeg-----	Silty, 20 inch plus Ppt zone,	Favorable	3,200	Rough fescue-----	45
	Northern Rocky Mountains,	Normal	2,900	Bluebunch wheatgrass-----	15
	central	Unfavorable	2,400	Idaho fescue-----	15
				Columbia needlegrass-----	15
				Mountain brome-----	10
551B:					
Lonesome-----	Sands, 10 to 14 inch Ppt zone,	Favorable	2,200	Prairie sandreed-----	40
	glaciated plains, North	Normal	1,700	Needleandthread-----	20
		Unfavorable	1,200	Indian ricegrass-----	10
				Sand dropseed-----	5
561B:					
Scobey-----	Silty, 10 to 14 inch Ppt zone,	Favorable	1,800	Bluebunch wheatgrass-----	30
	glaciated plains, North	Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
Kevin-----	Silty, 10 to 14 inch Ppt zone,	Favorable	1,800	Bluebunch wheatgrass-----	30
	glaciated plains, North	Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
561C:					
Scobey-----	Silty, 10 to 14 inch Ppt zone,	Favorable	1,800	Bluebunch wheatgrass-----	30
	glaciated plains, North	Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
Kevin-----	Silty, 10 to 14 inch Ppt zone,	Favorable	1,800	Bluebunch wheatgrass-----	30
	glaciated plains, North	Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
562B:					
Scobey-----	Silty, 10 to 14 inch Ppt zone,	Favorable	1,800	Bluebunch wheatgrass-----	30
	glaciated plains, North	Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
Linnet-----	Clayey, 10 to 14 inch Ppt zone,	Favorable	1,800	Western wheatgrass-----	30
	glaciated plains, North	Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Big sagebrush-----	5
				Winterfat-----	5
563A:					
Fortbenton-----	Sandy, 10 to 14 inch Ppt zone,	Favorable	2,000	Prairie sandreed-----	35
	glaciated plains, North	Normal	1,500	Needleandthread-----	20
		Unfavorable	1,000	Bluebunch wheatgrass-----	15
				Western wheatgrass-----	10
				Indian ricegrass-----	10

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry		
			weight		
			Ib/acre		Pct
563A: (cont.)					
Scobey-----	Sandy, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	2,000	Prairie sandreed-----	35
		Normal	1,500	Needleandthread-----	20
		Unfavorable	1,000	Bluebunch wheatgrass-----	15
				Western wheatgrass-----	10
				Indian ricegrass-----	10
601A:					
Havre-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	25
		Normal	1,400	Western wheatgrass-----	15
		Unfavorable	1,000	Needleandthread-----	15
				Green needlegrass-----	10
				Common snowberry-----	5
				Slender wheatgrass-----	5
				Canada wildrye-----	5
Glendive-----	Sandy, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	2,000	Needleandthread-----	20
		Normal	1,500	Western wheatgrass-----	10
		Unfavorable	1,000	Indian ricegrass-----	10
				Bluebunch wheatgrass-----	10
				Common snowberry-----	5
602A:					
Havre-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Western wheatgrass-----	30
		Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Big sagebrush-----	5
				Winterfat-----	5
605C:					
Yamcall-----	Silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,400	Western wheatgrass-----	25
		Unfavorable	1,000	Green needlegrass-----	20
				Needleandthread-----	15
Havre-----	Overflow, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	3,000	Basin wildrye-----	30
		Normal	2,500	Western wheatgrass-----	30
		Unfavorable	2,000	Green needlegrass-----	20
				Slender wheatgrass-----	5
				Common snowberry-----	5
621E:					
Sagedale-----	Clayey, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	2,100	Bluebunch wheatgrass-----	30
		Normal	1,700	Rough fescue-----	20
		Unfavorable	1,300	Western wheatgrass-----	10
				Idaho fescue-----	10
				Green needlegrass-----	10
				Lupine-----	5
				Columbia needlegrass-----	5
				Big sagebrush-----	5
Wayden-----	Shallow clay, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	1,300	Green needlegrass-----	20
		Normal	1,100	Bluebunch wheatgrass-----	20
		Unfavorable	800	Western wheatgrass-----	15
				Idaho fescue-----	10
				Winterfat-----	5
				Plains muhly-----	5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
621F:					
Wayden-----	Shallow clay, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	1,300	Green needlegrass-----	20
		Normal	1,100	Bluebunch wheatgrass-----	20
		Unfavorable	800	Western wheatgrass-----	15
				Idaho fescue-----	10
				Winterfat-----	5
				Plains muhly-----	5
Sagedale-----	Thin clayey, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,500	Rough fescue-----	20
		Unfavorable	1,100	Idaho fescue-----	10
				Western wheatgrass-----	5
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
623F:					
Linwell-----	Clayey, steep, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	2,300	Bluebunch wheatgrass-----	30
		Normal	2,000	Rough fescue-----	25
		Unfavorable	1,600	Columbia needlegrass-----	15
				Bearded wheatgrass-----	10
				Idaho fescue-----	5
				Creeping juniper-----	5
Winifred-----	Clayey, steep, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	2,300	Bluebunch wheatgrass-----	30
		Normal	2,000	Rough fescue-----	25
		Unfavorable	1,600	Columbia needlegrass-----	15
				Bearded wheatgrass-----	10
				Idaho fescue-----	5
				Creeping juniper-----	5
641F:					
Norbert-----	Shallow clay, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	1,300	Green needlegrass-----	20
		Normal	1,100	Bluebunch wheatgrass-----	20
		Unfavorable	800	Western wheatgrass-----	15
				Idaho fescue-----	10
				Winterfat-----	5
				Plains muhly-----	5
Barkof-----	Thin clayey, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,500	Rough fescue-----	20
		Unfavorable	1,100	Idaho fescue-----	10
				Western wheatgrass-----	5
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
653F:					
Fleak-----	Shallow, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,100	Bluebunch wheatgrass-----	50
		Normal	900	Prairie sandreed-----	20
		Unfavorable	600	Western wheatgrass-----	10
				Needleandthread-----	10
Twilight-----	Thin sandy, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,600	Prairie sandreed-----	30
		Normal	1,300	Needleandthread-----	20
		Unfavorable	900	Indian ricegrass-----	10
				Bluebunch wheatgrass-----	10

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
653F: (cont.)					
Yetull-----	Thin sandy, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,600	Prairie sandreed-----	30
		Normal	1,300	Needleandthread-----	20
		Unfavorable	900	Indian ricegrass-----	10
				Bluebunch wheatgrass-----	10
661E:					
Twilight-----	Thin sandy, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,600	Prairie sandreed-----	30
		Normal	1,300	Needleandthread-----	20
		Unfavorable	900	Indian ricegrass-----	10
				Bluebunch wheatgrass-----	10
Fleak-----	Shallow, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,100	Bluebunch wheatgrass-----	50
		Normal	900	Prairie sandreed-----	20
		Unfavorable	600	Western wheatgrass-----	10
				Needleandthread-----	10
671B:					
Bearpaw-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,200	Bluebunch wheatgrass-----	30
		Normal	1,800	Rough fescue-----	20
		Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
Vida-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,200	Bluebunch wheatgrass-----	30
		Normal	1,800	Rough fescue-----	20
		Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
671C:					
Bearpaw-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,200	Bluebunch wheatgrass-----	30
		Normal	1,800	Rough fescue-----	20
		Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
Vida-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,200	Bluebunch wheatgrass-----	30
		Normal	1,800	Rough fescue-----	20
		Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
673A:					
Bearpaw-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,200	Bluebunch wheatgrass-----	30
		Normal	1,800	Rough fescue-----	20
		Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry		
			weight		
			Lb/acre		Pct
673A: (cont.)					
Daglum-----	Clay pan, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	1,800	Western wheatgrass-----	35
		Normal	1,400	Bluebunch wheatgrass-----	15
		Unfavorable	1,000	Plains reedgrass-----	5
				Green needlegrass-----	5
				Sandberg bluegrass-----	5
				Columbia needlegrass-----	5
674B:					
Bearpaw-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,200	Bluebunch wheatgrass-----	30
		Normal	1,800	Rough fescue-----	20
		Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
Waltham-----	Clay pan, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	1,500	Western wheatgrass-----	35
		Normal	1,200	Bluebunch wheatgrass-----	15
		Unfavorable	800	Green needlegrass-----	10
				Plains reedgrass-----	5
				Sandberg bluegrass-----	5
681C:					
Gerber-----	Clayey, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	2,100	Bluebunch wheatgrass-----	30
		Normal	1,700	Rough fescue-----	20
		Unfavorable	1,300	Western wheatgrass-----	10
				Idaho fescue-----	10
				Green needlegrass-----	10
				Lupine-----	5
				Columbia needlegrass-----	5
				Big sagebrush-----	5
691D:					
Vida-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,200	Bluebunch wheatgrass-----	30
		Normal	1,800	Rough fescue-----	20
		Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
Williams-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,200	Bluebunch wheatgrass-----	30
		Normal	1,800	Rough fescue-----	20
		Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
692D:					
Vida-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable	2,200	Bluebunch wheatgrass-----	30
		Normal	1,800	Rough fescue-----	20
		Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
692D: (cont.)					
Bearpaw-----	Silty, 15 to 19 inch Ppt zone,	Favorable	2,200	Bluebunch wheatgrass-----	30
	Northern Rocky Mountain	Normal	1,800	Rough fescue-----	20
	foothills, Central	Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
693C:					
Vida-----	Silty, 15 to 19 inch Ppt zone,	Favorable	2,200	Bluebunch wheatgrass-----	30
	Northern Rocky Mountain	Normal	1,800	Rough fescue-----	20
	foothills, Central	Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
Bearpaw-----	Silty, 15 to 19 inch Ppt zone,	Favorable	2,200	Bluebunch wheatgrass-----	30
	Northern Rocky Mountain	Normal	1,800	Rough fescue-----	20
	foothills, Central	Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
Nishon-----	Overflow, 15 to 19 inch Ppt	Favorable	3,800	Basin wildrye-----	25
	zone, Northern Rocky Mountain	Normal	3,300	Western wheatgrass-----	15
	foothills, central	Unfavorable	2,000	Green needlegrass-----	15
				Sedge-----	10
				Columbia needlegrass-----	10
				Rough fescue-----	5
				Slender wheatgrass-----	5
701E:					
Work-----	Silty, 15 to 19 inch Ppt zone,	Favorable	2,600	Bluebunch wheatgrass-----	30
	Northern Rocky Mountain	Normal	2,200	Rough fescue-----	20
	foothills, Central	Unfavorable	1,800	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
Absarokee-----	Silty, 15 to 19 inch Ppt zone,	Favorable	2,600	Bluebunch wheatgrass-----	30
	Northern Rocky Mountain	Normal	2,200	Rough fescue-----	20
	foothills, Central	Unfavorable	1,800	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
702E:					
Work-----	Silty, 15 to 19 inch Ppt zone,	Favorable	2,600	Bluebunch wheatgrass-----	30
	Northern Rocky Mountain	Normal	2,200	Rough fescue-----	20
	foothills, Central	Unfavorable	1,800	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
702E: (cont.)					
Absarokee-----	Silty, 15 to 19 inch Ppt zone,	Favorable	2,600	Bluebunch wheatgrass-----	30
	Northern Rocky Mountain	Normal	2,200	Rough fescue-----	20
	foothills, Central	Unfavorable	1,800	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
721E:					
Zahill-----	Thin silty, 15 to 19 inch Ppt	Favorable	2,200	Bluebunch wheatgrass-----	30
	zone, Northern Rocky Mountain	Normal	1,800	Rough fescue-----	20
	foothills, central	Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
Vida-----	Silty, 15 to 19 inch Ppt zone,	Favorable	2,200	Bluebunch wheatgrass-----	30
	Northern Rocky Mountain	Normal	1,800	Rough fescue-----	20
	foothills, Central	Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
722F:					
Zahill-----	Thin silty, 15 to 19 inch Ppt	Favorable	1,800	Bluebunch wheatgrass-----	35
	zone, Northern Rocky Mountain	Normal	1,500	Rough fescue-----	20
	foothills, central	Unfavorable	1,100	Idaho fescue-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
Sagedale-----	Thin clayey, 15 to 19 inch Ppt	Favorable	1,800	Bluebunch wheatgrass-----	30
	zone, Northern Rocky Mountain	Normal	1,500	Rough fescue-----	20
	foothills, central	Unfavorable	1,100	Idaho fescue-----	10
				Western wheatgrass-----	5
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
Wayden-----	Shallow clay, 15 to 19 inch Ppt	Favorable	1,300	Green needlegrass-----	20
	zone, Northern Rocky Mountain	Normal	1,100	Bluebunch wheatgrass-----	20
	foothills, central	Unfavorable	800	Western wheatgrass-----	15
				Idaho fescue-----	10
				Winterfat-----	5
				Plains muhly-----	5
723F:					
Zahill-----	Thin silty, 15 to 19 inch Ppt	Favorable	1,800	Bluebunch wheatgrass-----	35
	zone, Northern Rocky Mountain	Normal	1,500	Rough fescue-----	20
	foothills, central	Unfavorable	1,100	Idaho fescue-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
723F: (cont.)					
Cabba-----	Shallow, 15 to 19 inch Ppt	Favorable	1,400	Bluebunch wheatgrass-----	30
	zone, Northern Rocky Mountain	Normal	1,200	Idaho fescue-----	20
	foothills, central	Unfavorable	900	Rough fescue-----	15
				Western wheatgrass-----	10
				Needleandthread-----	10
731F:					
Yetull-----	Sands, 10 to 14 inch Ppt zone,	Favorable	1,800	Prairie sandreed-----	40
	glaciated plains, North	Normal	1,400	Indian ricegrass-----	20
		Unfavorable	1,000	Needleandthread-----	10
				Sand dropseed-----	5
741B:					
Shambo-----	Silty, 15 to 19 inch Ppt zone,	Favorable	2,200	Bluebunch wheatgrass-----	30
	Northern Rocky Mountain	Normal	1,800	Rough fescue-----	20
	foothills, Central	Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
Straw-----	Overflow, 15 to 19 inch Ppt	Favorable	3,600	Basin wildrye-----	25
	zone, Northern Rocky Mountain	Normal	3,000	Western wheatgrass-----	15
	foothills, central	Unfavorable	2,400	Green needlegrass-----	15
				Sedge-----	10
				Columbia needlegrass-----	10
				Rough fescue-----	5
				Slender wheatgrass-----	5
745F:					
Shambo-----	Silty, steep, 15 to 19 inch Ppt	Favorable	2,300	Rough fescue-----	30
	zone, Northern Rocky Mountain	Normal	2,000	Bluebunch wheatgrass-----	15
	foothills, central	Unfavorable	1,600	Columbia needlegrass-----	15
				Idaho fescue-----	10
				Mountain brome-----	5
				Common snowberry-----	5
				Creeping juniper-----	5
Amor-----	Silty, steep, 15 to 19 inch Ppt	Favorable	2,300	Rough fescue-----	30
	zone, Northern Rocky Mountain	Normal	2,000	Bluebunch wheatgrass-----	15
	foothills, central	Unfavorable	1,600	Columbia needlegrass-----	15
				Idaho fescue-----	10
				Mountain brome-----	5
				Common snowberry-----	5
				Creeping juniper-----	5
Cabba-----	Shallow, 15 to 19 inch Ppt	Favorable	1,800	Bluebunch wheatgrass-----	30
	zone, Northern Rocky Mountain	Normal	1,500	Idaho fescue-----	20
	foothills, central	Unfavorable	1,200	Rough fescue-----	15
				Western wheatgrass-----	10
				Green needlegrass-----	10

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
761C:					
Hedoes-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable Normal Unfavorable	2,600 2,200 1,700	Bluebunch wheatgrass----- Rough fescue----- Idaho fescue----- Western wheatgrass----- Columbia needlegrass----- Green needlegrass----- Needleandthread-----	30 20 10 10 5 5 5
Belain-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable Normal Unfavorable	2,600 2,200 1,700	Bluebunch wheatgrass----- Rough fescue----- Idaho fescue----- Western wheatgrass----- Columbia needlegrass----- Green needlegrass----- Needleandthread-----	30 20 10 10 5 5 5
761E:					
Hedoes-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable Normal Unfavorable	2,600 2,200 1,700	Bluebunch wheatgrass----- Rough fescue----- Idaho fescue----- Western wheatgrass----- Columbia needlegrass----- Green needlegrass----- Needleandthread-----	30 20 10 10 5 5 5
Belain-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable Normal Unfavorable	2,600 2,200 1,700	Bluebunch wheatgrass----- Rough fescue----- Idaho fescue----- Western wheatgrass----- Columbia needlegrass----- Green needlegrass----- Needleandthread-----	30 20 10 10 5 5 5
793B:					
Yamacall-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable Normal Unfavorable	1,800 1,300 900	Western wheatgrass----- Green needlegrass----- Bluebunch wheatgrass----- Big sagebrush----- Winterfat-----	30 30 20 5 5
793C:					
Yamacall-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable Normal Unfavorable	1,800 1,300 900	Western wheatgrass----- Green needlegrass----- Bluebunch wheatgrass----- Big sagebrush----- Winterfat-----	30 30 20 5 5
795C:					
Yamacall-----	Clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable Normal Unfavorable	1,800 1,300 900	Western wheatgrass----- Green needlegrass----- Bluebunch wheatgrass----- Big sagebrush----- Winterfat-----	30 30 20 5 5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
795C: (cont.)					
Benz-----	Saline upland, 10 to 14 inch	Favorable	500	Western wheatgrass-----	50
	Ppt zone, glaciated plains,	Normal	300	Alkali sacaton-----	15
	North	Unfavorable	200	Inland saltgrass-----	10
				Greasewood-----	5
				Nuttall saltbush-----	5
795D:					
Yamacall-----	Clayey, 10 to 14 inch Ppt zone,	Favorable	1,800	Western wheatgrass-----	30
	glaciated plains, North	Normal	1,300	Green needlegrass-----	30
		Unfavorable	900	Bluebunch wheatgrass-----	20
				Big sagebrush-----	5
				Winterfat-----	5
Benz-----	Saline upland, 10 to 14 inch	Favorable	500	Western wheatgrass-----	50
	Ppt zone, glaciated plains,	Normal	300	Alkali sacaton-----	15
	North	Unfavorable	200	Inland saltgrass-----	10
				Greasewood-----	5
				Nuttall saltbush-----	5
801B:					
Williams-----	Silty, 15 to 19 inch Ppt zone,	Favorable	2,200	Bluebunch wheatgrass-----	30
	Northern Rocky Mountain	Normal	1,800	Rough fescue-----	20
	foothills, Central	Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
Vida-----	Silty, 15 to 19 inch Ppt zone,	Favorable	2,200	Bluebunch wheatgrass-----	30
	Northern Rocky Mountain	Normal	1,800	Rough fescue-----	20
	foothills, Central	Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
801C:					
Williams-----	Silty, 15 to 19 inch Ppt zone,	Favorable	2,200	Bluebunch wheatgrass-----	30
	Northern Rocky Mountain	Normal	1,800	Rough fescue-----	20
	foothills, Central	Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5
Vida-----	Silty, 15 to 19 inch Ppt zone,	Favorable	2,200	Bluebunch wheatgrass-----	30
	Northern Rocky Mountain	Normal	1,800	Rough fescue-----	20
	foothills, Central	Unfavorable	1,400	Idaho fescue-----	10
				Western wheatgrass-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
828A:					
Savage-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable Normal Unfavorable	2,200 1,800 1,400	Bluebunch wheatgrass----- Rough fescue----- Idaho fescue----- Western wheatgrass----- Columbia needlegrass----- Green needlegrass----- Needleandthread-----	30 20 10 10 5 5 5
842A:					
Savage-----	Clayey, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable Normal Unfavorable	2,100 1,700 1,300	Bluebunch wheatgrass----- Rough fescue----- Idaho fescue----- Western wheatgrass----- Green needlegrass----- Columbia needlegrass----- Needleandthread-----	30 20 10 10 10 5 5
Daglum-----	Clay pan, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable Normal Unfavorable	1,400 1,100 800	Western wheatgrass----- Bluebunch wheatgrass----- Green needlegrass----- Sedge----- Plains reedgrass----- Sandberg bluegrass----- Needleandthread-----	35 15 10 5 5 5 5
863E:					
Work-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable Normal Unfavorable	2,600 2,200 1,800	Bluebunch wheatgrass----- Rough fescue----- Idaho fescue----- Western wheatgrass----- Columbia needlegrass----- Green needlegrass----- Needleandthread-----	30 20 10 10 5 5 5
Roy-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable Normal Unfavorable	2,600 2,200 1,800	Bluebunch wheatgrass----- Rough fescue----- Idaho fescue----- Western wheatgrass----- Columbia needlegrass----- Green needlegrass----- Needleandthread-----	30 20 10 10 5 5 5
871B:					
Tamaneen-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable Normal Unfavorable	2,600 2,200 1,700	Bluebunch wheatgrass----- Rough fescue----- Idaho fescue----- Western wheatgrass----- Columbia needlegrass----- Green needlegrass----- Needleandthread-----	30 20 10 10 5 5 5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
871C:					
Tamaneen-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable Normal Unfavorable	2,600 2,200 1,700	Bluebunch wheatgrass----- Rough fescue----- Idaho fescue----- Western wheatgrass----- Columbia needlegrass----- Green needlegrass----- Needleandthread-----	30 20 10 10 5 5 5
883F:					
Perma-----	Silty, steep, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable Normal Unfavorable	2,200 1,600 1,000	Rough fescue----- Bluebunch wheatgrass----- Columbia needlegrass----- Idaho fescue----- Mountain brome----- Common snowberry----- Creeping juniper-----	30 15 15 10 5 5 5
Whitlash-----	Shallow, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable Normal Unfavorable	1,300 1,500 1,200	Bluebunch wheatgrass----- Rough fescue----- Idaho fescue----- Needleandthread-----	30 30 10 5
892F:					
Whitlash-----	Shallow, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable Normal Unfavorable	1,800 1,500 1,200	Bluebunch wheatgrass----- Rough fescue----- Idaho fescue----- Needleandthread-----	30 30 10 5
Belain-----	Silty, steep, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable Normal Unfavorable	2,300 1,900 1,500	Rough fescue----- Western wheatgrass----- Columbia needlegrass----- Idaho fescue----- Mountain brome----- Common snowberry----- Creeping juniper-----	30 15 15 10 5 5 5
895F:					
Belain-----	Silty, steep, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable Normal Unfavorable	2,300 1,900 1,500	Rough fescue----- Bluebunch wheatgrass----- Columbia needlegrass----- Idaho fescue----- Mountain brome----- Common snowberry----- Creeping juniper-----	30 15 15 10 5 5 5
896E:					
Belain-----	Silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, Central	Favorable Normal Unfavorable	2,500 2,000 1,500	Bluebunch wheatgrass----- Rough fescue----- Idaho fescue----- Western wheatgrass----- Columbia needlegrass----- Green needlegrass----- Needleandthread-----	30 20 10 10 5 5 5
Whitlash-----	Shallow, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable Normal Unfavorable	1,800 1,500 1,200	Bluebunch wheatgrass----- Rough fescue----- Idaho fescue----- Needleandthread-----	30 30 10 5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
911F:					
Belain-----	Silty, steep, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	2,300	Rough fescue-----	30
		Normal	1,900	Bluebunch wheatgrass-----	15
		Unfavorable	1,500	Columbia needlegrass-----	15
				Idaho fescue-----	10
				Mountain brome-----	5
				Common snowberry-----	5
				Creeping juniper-----	5
Whitlash-----	Shallow, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	1,800	Bluebunch wheatgrass-----	30
		Normal	1,500	Rough fescue-----	30
		Unfavorable	1,200	Idaho fescue-----	10
				Needleandthread-----	5
Hedoes-----	Silty, steep, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	2,300	Rough fescue-----	50
		Normal	1,900	Bluebunch wheatgrass-----	10
		Unfavorable	1,500	Columbia needlegrass-----	10
				Idaho fescue-----	5
				Mountain brome-----	5
				Common snowberry-----	5
				Creeping juniper-----	5
916C:					
Belain-----	Sandy, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	2,800	Prairie sandreed-----	25
		Normal	2,400	Bluebunch wheatgrass-----	20
		Unfavorable	1,900	Idaho fescue-----	10
				Needleandthread-----	10
				Rough fescue-----	10
				Columbia needlegrass-----	5
Hedoes-----	Sandy, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	2,800	Prairie sandreed-----	25
		Normal	2,400	Bluebunch wheatgrass-----	20
		Unfavorable	1,900	Idaho fescue-----	10
				Needleandthread-----	10
				Rough fescue-----	10
				Columbia needlegrass-----	5
925F:					
Sunburst-----	Thin clayey, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,400	Bluebunch wheatgrass-----	30
		Normal	1,100	Western wheatgrass-----	15
		Unfavorable	800	Green needlegrass-----	15
				Plains muhly-----	5
Lambeth-----	Thin silty, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	1,400	Bluebunch wheatgrass-----	35
		Normal	1,100	Western wheatgrass-----	20
		Unfavorable	800	Needleandthread-----	15
				Green needlegrass-----	10
				Plains muhly-----	5
941D:					
Busby-----	Sandy, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	2,000	Prairie sandreed-----	35
		Normal	1,500	Needleandthread-----	20
		Unfavorable	1,000	Bluebunch wheatgrass-----	15
				Western wheatgrass-----	10
				Indian ricegrass-----	10

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Ib/acre		Pct
941D: (cont.)					
Twilight-----	Sandy, 10 to 14 inch Ppt zone, glaciated plains, North	Favorable	2,000	Prairie sandreed-----	35
		Normal	1,500	Needleandthread-----	20
		Unfavorable	1,000	Bluebunch wheatgrass-----	15
				Western wheatgrass-----	10
				Indian ricegrass-----	10
943C:					
Tally-----	Sandy, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	2,400	Prairie sandreed-----	25
		Normal	2,000	Bluebunch wheatgrass-----	20
		Unfavorable	1,600	Idaho fescue-----	10
				Needleandthread-----	10
				Rough fescue-----	10
				Columbia needlegrass-----	5
943E:					
Tally-----	Sandy, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	2,400	Prairie sandreed-----	25
		Normal	2,000	Bluebunch wheatgrass-----	20
		Unfavorable	1,600	Idaho fescue-----	10
				Needleandthread-----	10
				Rough fescue-----	10
				Columbia needlegrass-----	5
Vebar-----	Sandy, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	2,400	Prairie sandreed-----	25
		Normal	2,000	Bluebunch wheatgrass-----	20
		Unfavorable	1,600	Idaho fescue-----	10
				Needleandthread-----	10
				Rough fescue-----	10
				Columbia needlegrass-----	5
943F:					
Tally-----	Thin sandy, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	2,200	Prairie sandreed-----	35
		Normal	1,700	Bluebunch wheatgrass-----	15
		Unfavorable	1,300	Idaho fescue-----	10
				Rough fescue-----	10
				Columbia needlegrass-----	5
				Needleandthread-----	5
				Common snowberry-----	5
Cohagen-----	Shallow, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	1,400	Bluebunch wheatgrass-----	20
		Normal	1,200	Idaho fescue-----	20
		Unfavorable	900	Prairie sandreed-----	20
				Rough fescue-----	15
				Western wheatgrass-----	10
				Needleandthread-----	10
965F:					
Cabba-----	Shallow, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	1,400	Bluebunch wheatgrass-----	30
		Normal	1,200	Idaho fescue-----	20
		Unfavorable	900	Rough fescue-----	15
				Western wheatgrass-----	10
				Needleandthread-----	10
Macar-----	Thin silty, 15 to 19 inch Ppt zone, Northern Rocky Mountain foothills, central	Favorable	1,800	Bluebunch wheatgrass-----	35
		Normal	1,500	Rough fescue-----	20
		Unfavorable	1,100	Idaho fescue-----	10
				Columbia needlegrass-----	5
				Green needlegrass-----	5
				Needleandthread-----	5

Rangeland Productivity and Characteristic Plant Communities--Continued

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Ib/acre		Pct
971F:					
Neldore-----	Shallow clay, 10 to 14 inch Ppt	Favorable	1,000	Bluebunch wheatgrass-----	50
	zone, glaciated plains, North	Normal	800	Western wheatgrass-----	20
		Unfavorable	500	Green needlegrass-----	10
				Plains muhly-----	5
				Needleandthread-----	5
Bascovy-----	Thin clayey, 10 to 14 inch Ppt	Favorable	1,400	Bluebunch wheatgrass-----	30
	zone, glaciated plains, North	Normal	1,100	Western wheatgrass-----	15
		Unfavorable	800	Green needlegrass-----	15
				Plains muhly-----	5
972F:					
Neldore-----	Shallow clay, 10 to 14 inch Ppt	Favorable	1,000	Bluebunch wheatgrass-----	50
	zone, glaciated plains, North	Normal	800	Western wheatgrass-----	20
		Unfavorable	500	Green needlegrass-----	10
				Plains muhly-----	5
				Needleandthread-----	5
974F:					
Neldore-----	Shallow clay, 10 to 14 inch Ppt	Favorable	1,000	Bluebunch wheatgrass-----	50
	zone, glaciated plains, North	Normal	800	Western wheatgrass-----	20
		Unfavorable	500	Green needlegrass-----	10
				Plains muhly-----	5
				Needleandthread-----	5
Hillon-----	Thin silty, 10 to 14 inch Ppt	Favorable	1,400	Bluebunch wheatgrass-----	35
	zone, glaciated plains, North	Normal	1,100	Western wheatgrass-----	20
		Unfavorable	800	Needleandthread-----	15
				Green needlegrass-----	10
				Plains muhly-----	5

Woodland Understory Vegetation and Habitat Types

(Absence of an entry indicates that data were not available)

Map symbol and soil name	Total production		Characteristic vegetation	Compo- sition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
99:					
Rivra-----	Favorable	600	Silverberry-----	25	---
	Normal	500	Rose-----	20	
	Unfavorable	400	Canada wildrye-----	15	
			Redosier dogwood-----	5	
			Snowberry-----	5	
Hanly-----	Favorable	700	Silverberry-----	25	---
	Normal	600	Rose-----	20	
	Unfavorable	400	Canada wildrye-----	15	
			Redosier dogwood-----	5	
			Snowberry-----	5	
130A:					
Nesda-----	Favorable	600	Slender wheatgrass-----	15	---
	Normal	500	Snowberry-----	15	
	Unfavorable	400	Western wheatgrass-----	15	
			Basin wildrye-----	10	
			Common chokecherry-----	10	
			Rose-----	10	
			Redosier dogwood-----	5	
			Silverberry-----	5	
			Willow-----	5	
Nesda-----	Favorable	600	Slender wheatgrass-----	15	---
	Normal	500	Snowberry-----	15	
	Unfavorable	400	Western wheatgrass-----	15	
			Basin wildrye-----	10	
			Common chokecherry-----	10	
			Rose-----	10	
			Redosier dogwood-----	5	
			Silverberry-----	5	
			Willow-----	5	
McIlwaine-----	Favorable	800	Slender wheatgrass-----	15	---
	Normal	700	Snowberry-----	15	
	Unfavorable	600	Western wheatgrass-----	15	
			Basin wildrye-----	10	
			Common chokecherry-----	10	
			Rose-----	10	
			Silverberry-----	5	
			Willow-----	5	
460:					
Laceycreek-----	Favorable	1,500	Common snowberry-----	20	Douglas-fir/snowberry-snowberry phase, Douglas-fir/canada violet
	Normal	1,200	Canada wildrye-----	15	
	Unfavorable	900	Woods rose-----	15	
			Red raspberry-----	10	
			Saskatoon serviceberry-----	5	
			Sticky geranium-----	5	

Woodland Understory Vegetation and Habitat Types--Continued

(Absence of an entry indicates that data were not available)

Map symbol and soil name	Total production		Characteristic vegetation	Compo- sition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
530F:					
Warwood-----	Favorable	500	Pinegrass-----	40	Douglas-fir/dwarf huckleberry,
	Normal	400	Dwarf huckleberry-----	10	Douglas-fir/bunchberry
	Unfavorable	300	Blue huckleberry-----	5	dogwood-twinflower phase
			Bunchberry dogwood-----	5	
			Roughleaf ricegrass-----	5	
			Twinflower-----	5	
			White spirea-----	5	
			Kinnikinnick-----	2	
			Rose-----	2	
			Western meadowrue-----	2	
550F:					
Elkner-----	Favorable	500	Pinegrass-----	25	Douglas-fir/dwarf huckleberry,
	Normal	400	Bunchberry dogwood-----	10	Douglas-fir/twinflower
	Unfavorable	300	Dwarf huckleberry-----	10	
			Blue huckleberry-----	5	
			Common snowberry-----	5	
			Heartleaf arnica-----	5	
			Russet buffaloberry-----	5	
			White spirea-----	5	
			Twinflower-----	2	
560F:					
Elve-----	Favorable	200	Pinegrass-----	25	Douglas-fir/pinegrass-pinegrass
	Normal	150	White spirea-----	10	phase, Douglas-fir/twinflower
	Unfavorable	50	Common juniper-----	5	
			Heartleaf arnica-----	5	
			Kinnikinnick-----	5	
			Rose-----	5	
			Twinflower-----	2	
580F:					
Garlet-----	Favorable	500	Pinegrass-----	25	Douglas-fir/dwarf huckleberry,
	Normal	400	Dwarf huckleberry-----	10	Douglas-fir/twinflower,
	Unfavorable	300	Arnica-----	5	Douglas-fir/bunchberry
			Blue huckleberry-----	5	dogwood-twinflower phase
			Bunchberry dogwood-----	5	
			Twinflower-----	5	
			White spirea-----	5	
Elkner-----	Favorable	500	Pinegrass-----	25	Douglas-fir/dwarf huckleberry,
	Normal	400	Bunchberry dogwood-----	10	Douglas-fir/twinflower,
	Unfavorable	300	Dwarf huckleberry-----	10	Douglas-fir/bunchberry
			Blue huckleberry-----	5	dogwood-twinflower phase
			Common snowberry-----	5	
			Heartleaf arnica-----	5	
			Russet buffaloberry-----	5	
			White spirea-----	5	
			Twinflower-----	2	
603A:					
Havre-----	Favorable	600	Bluebunch wheatgrass-----	25	---
	Normal	500	Needleandthread-----	15	
	Unfavorable	400	Western wheatgrass-----	15	
			Green needlegrass-----	10	
			Canada wildrye-----	5	
			Common chokecherry-----	5	
			Common snowberry-----	5	

Woodland Understory Vegetation and Habitat Types--Continued

(Absence of an entry indicates that data were not available)

Map symbol and soil name	Total production		Characteristic vegetation	Compo- sition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
603A: (cont.)					
Havre-----	Unfavorable		Slender wheatgrass-----	5	
			Unnamed perennial forbs-----	5	
Glendive-----	Favorable	800	Common snowberry-----	15	---
	Normal	600	Western wheatgrass-----	15	
	Unfavorable	400	American licorice-----	10	
			Redosier dogwood-----	10	
			Willow-----	10	
			Common chokecherry-----	5	
			Green needlegrass-----	5	
			Rose-----	5	
			Saskatoon serviceberry-----	5	
			Silver buffaloberry-----	5	
630E:					
Crow-----	Favorable	600	Pinegrass-----	25	Douglas-fir/snowberry-pinegrass
	Normal	500	Common snowberry-----	10	phase, Douglas-fir/saskatoon
	Unfavorable	400	Nodding brome grass-----	10	serviceberry
			White spirea-----	10	
			Heartleaf arnica-----	5	
			Roughleaf ricegrass-----	5	
			Twinflower-----	5	
Lubrecht-----	Favorable	600	Pinegrass-----	25	Douglas-fir/snowberry-pinegrass
	Normal	500	Common snowberry-----	15	phase, Douglas-fir/saskatoon
	Unfavorable	400	White spirea-----	10	serviceberry
			Elk sedge-----	5	
			Heartleaf arnica-----	5	
			Saskatoon serviceberry-----	2	
			Kinnikinnick-----	1	
			Rough fescue-----	1	
650D:					
Laceycreek-----	Favorable	600	Pinegrass-----	30	Douglas-fir/snowberry-pinegrass
	Normal	500	Common snowberry-----	15	phase, Douglas-fir/saskatoon
	Unfavorable	400	White spirea-----	10	serviceberry
			Kinnikinnick-----	5	
			Woods rose-----	5	
			Twinflower-----	2	
Ambrant-----	Favorable	600	Pinegrass-----	30	Douglas-fir/snowberry-pinegrass
	Normal	450	Common snowberry-----	15	phase, Douglas-fir/saskatoon
	Unfavorable	300	White spirea-----	10	serviceberry
			Heartleaf arnica-----	5	
			Woods rose-----	5	
			Northern bedstraw-----	2	
			Western meadowrue-----	2	
			Currant-----	1	
			Vetch-----	1	
650F:					
Laceycreek-----	Favorable	600	Pinegrass-----	30	Douglas-fir/snowberry-pinegrass
	Normal	500	Common snowberry-----	15	phase, Douglas-fir/saskatoon
	Unfavorable	400	White spirea-----	10	serviceberry
			Kinnikinnick-----	5	
			Woods rose-----	5	
			Twinflower-----	2	

Woodland Understory Vegetation and Habitat Types--Continued

(Absence of an entry indicates that data were not available)

Map symbol and soil name	Total production		Characteristic vegetation	Compo- sition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
650F:					
Eaglecreek-----	Favorable	500	Pinegrass-----	25	Douglas-fir/snowberry-pinegrass
	Normal	400	Common snowberry-----	15	phase, Douglas-fir/saskatoon
	Unfavorable	300	White spirea-----	10	serviceberry
			Common juniper-----	5	
			Feather Solomons seal-----	5	
			Heartleaf arnica-----	5	
			Northern bedstraw-----	5	
			Unnamed perennial forbs-----	5	
			Unnamed shrubs-----	5	
			Oregongrape-----	1	
654F:					
Fleak-----	Favorable	800	Bluebunch wheatgrass-----	40	Ponderosa pine/bluebunch wheatgrass
	Normal	600	Prairie sandreed-----	20	
	Unfavorable	400	Needleandthread-----	10	
			Unnamed perennial grasses-----	10	
			Creeping juniper-----	5	
			Unnamed perennial forbs-----	5	
			Unnamed shrubs-----	5	
			Western wheatgrass-----	5	
680F:					
Winkler-----	Favorable	600	Pinegrass-----	20	Douglas-fir/snowberry-pinegrass
	Normal	450	White spirea-----	15	phase
	Unfavorable	300	Common snowberry-----	10	
			Heartleaf arnica-----	5	
Ambrant-----	Favorable	600	Pinegrass-----	30	Douglas-fir/snowberry-pinegrass
	Normal	450	Common snowberry-----	15	phase
	Unfavorable	300	White spirea-----	10	
			Heartleaf arnica-----	5	
			Woods rose-----	5	
			Northern bedstraw-----	2	
			Western meadowrue-----	2	
			Currant-----	1	
			Vetch-----	1	
Winkler-----	Favorable	400	Bluebunch wheatgrass-----	25	Douglas-fir/snowberry-bluebunch
	Normal	300	Arrowleaf balsamroot-----	15	wheatgrass phase,
	Unfavorable	200	Rough fescue-----	10	Douglas-fir/saskatoon serviceberry
			Black hawthorn-----	5	
			Common chokecherry-----	5	
			Common snowberry-----	5	
			Idaho fescue-----	5	
			Heartleaf arnica-----	2	
			Kinnikinnick-----	2	
			Saskatoon serviceberry-----	2	
895F:					
Whitlash-----	Favorable	1,200	Bluebunch wheatgrass-----	30	Ponderosa pine/Idaho fescue-rough
	Normal	1,000	Rough fescue-----	20	fescue phase, ponderosa
	Unfavorable	800	Idaho fescue-----	15	pine/bluebunch wheatgrass
			Creeping juniper-----	5	
			Golden currant-----	5	

Forest Land

Approximately 2 percent, or about 56,000 acres, of the survey area is forest land. Of this amount about 22 percent is considered noncommercial. The commercial forest land is generally of low productivity, producing less than 50 cubic feet per acre per year. The low production potential of the area, the small acreage in forest land, the young age (generally less than 100 years) of the forest lands, and the small tree diameters limit the sawtimber volume available. Consequently limited harvesting of the timber resource has or is occurring. The forest land within the survey area is protected from fire by the Department of State Lands Division of Forestry, U.S. Forest Service and local fire districts.

Soils vary in their ability to support the growth of trees. Depth, fertility, texture, and the available water capacity influence tree growth. Elevation, aspect, soils, and climate determine the kinds of trees that can be expected on any site and their growth rate. The forest land soils in the soil survey area range from shallow to very deep, from nongravely to extremely gravelly, and from fine-textured to coarse-textured. Because of differences among the soils, as well as differences in climate, topography, and geology, the forest lands vary in composition and productivity.

The major part of the coniferous forest land within the survey area occurs in the Highwood and Bearpaw Mountains. The Bearpaw Mountains occur in the northeastern part of the county. Elevation ranges from about 3,500 feet to 6,500 feet. Ponderosa pine and Douglas-fir are the dominant cover types there. The Highwood Mountains occur in the southern part of the county. Elevation ranges from about 4,000 feet to 7,700 feet. Douglas-fir is the dominant cover type there.

Douglas-fir is the cover type occupying the largest acreage. Cover types of ponderosa pine, lodgepole pine, black cottonwood, narrowleaf cottonwood, plains cottonwood, and quaking aspen cover lesser acreages.

Black cottonwood and narrowleaf cottonwood are mainly in the southern parts of the survey area adjacent to Highwood Creek and Shonkin Creek. These cottonwoods are associated with the Nesda and McIlwaine soils that developed in recent alluvium.

Narrowleaf cottonwood and plains cottonwood are mainly in the western and central parts of the survey area along the Teton, Marias, and Missouri rivers. These cottonwoods are associated with the Rivra and Hanly soil series.

Plains cottonwood can be along the Missouri, Teton, and Marias drainageways at the lower elevations within the survey area. This cottonwood is associated with the Havre and Glendive soil series.

The occasionally flooded phases of Havre, Glendive, Nesda, McIlwaine, Rivra, and Hanly soils are generally forest land. Shrubs predominate in the understory. Rarely flooded phases of these series occasionally are forest land. Trees have been cleared from much of the rarely flooded and some of the occasionally flooded alluvial soil areas.

There are small scattered stands of ponderosa pine in the survey area. They are generally low producing and are considered noncommercial forest land. On the uplands, mainly in the central and southeastern parts of the survey area, they are associated with the Fleak soil series. Fleak soils are shallow and are in the 11 to 14 inch precipitation zone. The forest land understory plant community is dominated by bluebunch wheatgrasses. In the northeastern parts of the survey area, on the uplands, they are associated with the Whitlash soil series. Whitlash soils are shallow soils in the 15 to 19 inch precipitation zone. The forest land understory plant community is dominated by Idaho fescue.

Mainly in the northeastern parts of the survey, in the Bearpaw Mountains, there are ponderosa pine and Douglas-fir overstories. These forest lands are mainly in the 18 to 24 inch precipitation zone. They are associated with the Lacey Creek, Ambrant, Eagle Creek, Crow, Lubrecht, and Winkler soil series. They are on moderately sloping to very steep slopes and are predominately very deep and moderately deep soils. The forest land understory plant community is dominated by a snowberry and serviceberry habitat types.

Quaking aspen are in the northeastern and southern parts of the survey area and are associated with the Lacey Creek soil series. In this survey area it is

considered noncommercial forest land. Lacey Creek soils are very deep soils with moderate to high available water capacity, located in positions to receive extra moisture as run-in. Quaking aspen is most frequent in the 17 to 22 inch precipitation zone. The forest land understory plant community is a snowberry and Canadian violet habitat type.

Douglas-fir and lodgepole pine are in the southern and northeastern parts of the survey area in the Highwood and Bearpaw Mountains and Square Butte area. These overstories are associated with the Elve, Elkner, Garlet, and Warwood soil series. The lodgepole pine are associated with the Elve and Elkner soil series. The Elkner soil series also has a Douglas-fir overstory. Associated soils are the Libeg and Arrowpeak series, and they are predominately in rangeland. These soils range from shallow to very deep in depth with some areas of rock outcrop. They are generally on hilly to very steep slopes. The precipitation ranges from 18 to 28 inches per year. The forest land understory plant community under the Elve and Elkner soil series is dominated by pine grass and twin flower habitat types. The forest land understory plant community under the Garlet and Warwood soil series is dominated by dwarf huckleberry and bunchberry dogwood habitat types.

The tables "Forest Land Productivity" and "Forest Land Management" can be used by forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed.

Woodland Ordination System

The table "Forest Land Management" lists the ordination (woodland suitability) symbol for each soil. The ordination system is a nationwide uniform system of labeling soils or groups of soils that are similar in use and management. The primary factors evaluated in the woodland ordination system are productivity of the forest overstory tree species and the principal soil properties resulting in hazards and limitations that affect forest management. There are three parts of the ordination system: class, subclass, and group. The class and subclass are referred to as the ordination symbol.

Ordination Class Symbol

The first element of the ordination symbol is a number that denotes potential productivity in terms of cubic meters of wood per hectare per year for the indicator tree species. The larger the number, the greater the potential productivity. Potential productivity is based on site index and the corresponding

culmination of mean annual increment. For example, the number 1 indicates a potential production of 1 cubic meter of wood per hectare per year (14.3 cubic feet per acre per year) and 10 indicates a potential production of 10 cubic meters of wood per hectare per year (143 cubic feet per acre per year).

Indicator species is a species that is common in the area and is generally, but not necessarily, the most productive on the soil. It is the species that determines the ordination class. It is the first species listed for a particular map unit in the table "Forest Land Productivity." This table shows the productivity for all species where data have been collected.

Site index is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands. The site indexes shown in the table "Forest Land Productivity" are averages based on measurements made at sites that are representative of the soil series. When the site index and forest land productivity of different soils are compared, the values for the same tree species should be compared. The higher the site index number, the more productive the soil for that species. Site index values are used in conjunction with yield tables to determine average annual yields. Indirectly, they are used to determine the productivity class in the ordination class symbol.

The site index base age is 30 years for narrowleaf cottonwood and plains cottonwood, 50 years for black cottonwood and Douglas-fir, 80 years for quaking aspen, and 100 years for lodgepole and ponderosa pine. Site index values for the tables were computed from the following references: R. R. Alexander for lodgepole pine, J. E. Brickell for Douglas-fir, W. H. Meyer for ponderosa pine, F. S. Baker for quaking aspen, and W. J. Sauerwein for black cottonwood. For narrowleaf cottonwood and plains cottonwood, locally adapted site index curves developed by the Natural Resources Conservation Service were used.

Ordination Subclass Symbol

The second element of the ordination symbol, or subclass, is a capital letter that indicates certain soil or physiographic characteristics that contribute to important hazards or limitations to be considered in management. The subclasses are defined as follows:

Subclass X indicates that forest land use and management are limited by stones or rocks.

Subclass W indicates that forest land use and management are significantly limited by excess water,

either seasonally or throughout the year. Restricted drainage, a high water table, or flooding can adversely affect either stand development or management.

Subclass T indicates that the root zone has toxic substances. Excessive alkalinity, acidity, sodium salts, or other toxic substances impede the development of desirable species.

Subclass D indicates that forest land use and management are limited by a restricted rooting depth. The rooting depth is restricted by hard bedrock, a hardpan, or other restrictive layers in the soil.

Subclass C indicates that forest land use and management are limited by the kind or amount of clay in the upper part of the soil.

Subclass S indicates that the soil is sandy, has a low available water capacity, and normally has a low content of available plant nutrients. The use of equipment is limited during dry periods.

Subclass F indicates that forest land use and management are limited by a high content of rock fragments that are larger than 2 millimeters and smaller than 10 inches. This subclass includes flaggy soils.

Subclass R indicates that forest land use and management are limited by excessive slope.

Subclass A indicates that no significant limitations affect forest land use and management.

Forest Land Management and Productivity

Information about the productivity and management of the forested map units in the survey area is given in the tables "Forest Land Management" and "Forest Land Productivity."

Management Concerns

In the table "Forest Land Management," the soils are rated for the erosion hazard, the equipment limitation, seedling mortality, the windthrow hazard, and plant competition.

The *erosion hazard* is *slight* if the expected soil loss is small; *moderate* if some measures are needed to control erosion during logging and road construction; and *severe* if intensive management or special equipment and methods are needed to prevent excessive soil loss.

The *equipment limitation* is *slight* if the use of equipment is not limited to a particular kind of equipment or time of year; *moderate* if there is a short seasonal limitation or a need for some modification in the management of equipment; and *severe* if there is a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings are for seedlings that are from a good planting stock and that are properly planted during a period of average rainfall. A rating of *slight* indicates that the expected mortality of the planted seedlings is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Windthrow hazard is *slight* if trees in wooded areas are not expected to be blown down by commonly occurring winds; *moderate* if some trees are blown down during periods of excessive soil wetness and strong winds; and *severe* if many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

For this survey, soils on north slopes that remain moist into the spring, those having a high water table from 20 to 30 inches, and stands with high basal areas that limit root development were considered moderately prone to windthrow even though the soil materials provided a good anchoring medium for tree roots. On drier sites, clayey soils without rock fragments were considered in this category. Soils that have a high water table within 20 inches of the surface long enough to inhibit root development were considered to be severely susceptible to windthrow.

Plant competition is *slight* if there is little or no competition from other plants; *moderate* if plant competition is expected to hinder the development of a fully stocked stand of desirable trees; and *severe* if plant competition is expected to prevent the establishment of a desirable stand unless the site is intensively prepared, weeded, or otherwise managed for the control of undesirable plants.

Potential Productivity

The potential productivity of merchantable or *common trees* is expressed as a site index, which is described under the heading "Ordination Class Symbol." Commonly grown trees are those that forest land managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The column *trees that stands are commonly managed for* in the table "Forest Land Productivity" lists trees that are suitable for commercial wood production and that are suited to the soils.

The following sources were used to compute yields for this survey: "Even-aged Stands of Ponderosa Pine," (Meyer, W.H., 1938) was used for estimating the yields of Douglas-fir and ponderosa pine. "Yield Tables for Managed Stands of Lodgepole Pine in Colorado and Wyoming," (Myers, C.A., 1967) was used to estimate the board-foot yield of lodgepole pine. Board-foot volumes in the reference are based on Scribner's log

rule and includes all trees larger than 10 inches in diameter breast height to an 8-inch top diameter inside bark. Total cubic-foot yield estimates are based on "Gross and Net Yield Tables for Lodgepole Pine," (Dahms, W.G., 1964). In this reference, total cubic-foot volume estimates (inside bark) are based on all trees with diameter breast height inside the bark of more than 1-inch. "Aspen in the Central Rocky Mountain Region," (Baker, F.S., 1925) was used to estimate quaking aspen yields. Total cubic-foot volume estimates in the reference are based on all trees more than 4 inches diameter breast height.

Forest Access Road Limitations and Hazards

The major management concerns affecting the use of the detailed map units in the survey area for forest access roads are listed in the table "Main Forest Access Road Limitations and Hazards." The significance of each limitation or hazard and the criteria used to determine the limitation or hazard are described in this section.

Areas of rock outcrop and depth to bedrock can increase the cost of road construction and influence route planning. Constructing the roads is difficult because of the need for rock removal and for additional soil material to provide a suitable road surface.

Boulders increase the cost of road construction and influence route planning. Construction is difficult mainly because of the need for extraction and disposal of the boulders.

Dustiness of the road surface material may cause safety problems and accelerate equipment wear. Dust-abatement measures are needed during dry periods.

The erodibility of the soil material in the roadbed influences the probability of *erosion by water* resulting from the channeling of runoff in the roadway. Erosion can result in the sedimentation of streams. It can be controlled by reducing road grades and controlling runoff onto and off of the road surface through the installation of drainage measures.

Flooding in the area where a road is constructed may restrict use, result in damage to the roadway, and result in the sedimentation of waterways. The hazard of flooding can be reduced by installing a drainage system, elevating the roadbed, and using riprap and diversions.

Low soil strength of the soil material used to construct the road surface can result in rutting, in drainage problems, and in poor trafficability during wet periods. The road should be used only during dry periods or when the surface is frozen. Surfacing with

material of suitable strength and installing a drainage system can help to overcome this limitation.

Roadbed material that has a high *shrink-swell potential* shrinks and swells markedly during dry and wet periods. Excessive shrinking and swelling can damage the road surface or other features, such as bridge abutments, culverts, and erosion-control structures.

A steep *slope* results in increased construction and maintenance costs and increased sedimentation because of the large cuts necessary to create an adequate roadbed. Seeding of the cut slope to suitable vegetation minimizes sedimentation. Large cuts can increase instability of the slope. Where slumping is a hazard, slope failure can become a significant maintenance and environmental problem. Areas where the slope is steep should not be used as sites for roads.

Slumping causes safety problems and increases maintenance costs. Frequent clearing of slumped soil in the roadbed or rebuilding of the roadway may be needed to keep the road serviceable and drainage systems functioning.

Surface stones cause problems in maintaining a smooth road surface that has good trafficability. Unless the stones are removed, additions of suitable stone-free material may be needed when the road is surfaced.

Roads built across soils that have a *water table* may require substantial ballast, fabric, internal drainage systems, and other measures that maintain a road surface that has good trafficability. Construction and use of the road only during periods when the water table is not near the surface or when the road is frozen help to maintain trafficability and reduce the potential for site damage.

Following is an explanation of the criteria used to determine the limitations or hazards.

Areas of rock outcrop.—Rock outcrop is a named component of the map unit.

Areas of rubble land.—Rubble land is a named component of the map unit.

Boulders.—The terms describing the texture of the surface layer include a bouldery modifier, or the soil is a bouldery phase.

Depth to rock.—Hard bedrock is within a depth of 60 inches.

Dustiness.—The surface layer is silt, silt loam, loam, or very fine sandy loam.

Erosion by water.—The surface K factor multiplied by the upper slope limit is more than 10.

Flooding.—The component of the map unit is occasionally flooded or frequently flooded.

Low soil strength.—The component of the map unit has one of the following Unified classifications within the 60-inch profile: ML, CL, MH, CH, OL, PT, or GC.

Shrink-swell potential.—The component of the map unit has a high shrink-swell potential in a layer that is at least 10 inches thick and is within 40 inches of the surface.

Slope.—The upper slope limit is more than 35 percent.

Slumping.—The component of the map unit meets the requirements for low soil strength and has slopes of more than 35 percent.

Surface stones.—The terms describing the texture of the surface layer include a very stony or extremely stony modifier, or the soil is a very stony or extremely stony phase.

Water table.—The component of the map unit has a water table within a depth of 60 inches.

Forest Land Management

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that data were not available)

Map symbol and soil name	Ordi- nation symbol	Management concerns				
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow/ hazard	Plant competition
99:						
Rivra-----	1W	---	Moderate	Severe	Moderate	Moderate
Hanly-----	1W	---	Moderate	Severe	Moderate	Moderate
130A:						
Nesda-----	1W	Moderate	Moderate	Severe	Slight	Moderate
Nesda-----	1W	Moderate	Moderate	Severe	Slight	Moderate
McIlwaine-----	1W	Moderate	Moderate	Severe	Slight	Moderate
460:						
Laceycreek-----	2A	Moderate	Moderate	Slight	Slight	Moderate
530F:						
Warwood-----	5R	---	Severe	Slight	Moderate	Moderate
550F:						
Elkner-----	5S	Severe	Moderate	Slight	Slight	Moderate
560F:						
Elve-----	3R	Severe	Severe	Moderate	Moderate	Severe
580F:						
Garlet-----	5R	---	Severe	Moderate	Slight	Moderate
Elkner-----	5S	Severe	Moderate	Slight	Slight	Moderate
603A:						
Havre-----	5W	---	Moderate	Moderate	Slight	Moderate
Glendive-----	2W	Moderate	Moderate	Moderate	Slight	Severe
630E:						
Crow-----	5C	Severe	Severe	Slight	Moderate	Moderate
Lubrecht-----	5C	---	Severe	Slight	Moderate	Moderate
650D:						
Laceycreek-----	5A	Slight	Slight	Slight	Slight	Moderate
Ambrant-----	5A	Moderate	Slight	Moderate	Slight	Moderate
650F:						
Laceycreek-----	5A	Moderate	Moderate	Slight	Slight	Moderate
Eaglecreek-----	4R	---	Severe	Moderate	Slight	Moderate
654F:						
Fleak-----	2R	Severe	Severe	Severe	Severe	Severe
680F:						
Winkler-----	4R	Severe	Severe	Severe	Slight	Severe
Ambrant-----	5R	Severe	Severe	Moderate	Slight	Severe
Winkler-----	4R	Severe	Severe	Severe	Slight	Moderate

Forest Land Management--Continued

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that data were not available)

Map symbol and soil name	Ordi- nation symbol	Management concerns				
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition
895F: Whitlash-----	2R	Severe	Severe	Moderate	Severe	Moderate

Forest Land Productivity

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that data were not available)

Map symbol and soil name	Common trees	Site index	Productivity class	Board feet	Cubic feet	Trees that stands are commonly managed for--
99:						
Rivra-----	Narrowleaf cottonwood----	40	---	---	---	---
	Plains cottonwood-----	40	---	---	---	
Hanly-----	Black cottonwood-----	40	---	---	---	---
	Narrowleaf cottonwood----	40	---	---	---	
130A:						
Nesda-----	Black cottonwood-----	---	---	---	---	Narrowleaf cottonwood
	Narrowleaf cottonwood----	25	---	---	---	
Nesda-----	Black cottonwood-----	25	---	---	---	Narrowleaf cottonwood,
	Narrowleaf cottonwood----	25	---	---	---	black cottonwood
McIlwaine-----	Narrowleaf cottonwood----	---	---	---	---	---
	Plains cottonwood-----	---	---	---	---	
460:						
Laceycreek-----	Quaking aspen-----	61	2	---	---	---
530F:						
Warwood-----	Lodgepole pine-----	78	5	284	67	Lodgepole pine,
	Douglas-fir-----	48	5	216	65	Douglas-fir
550F:						
Elkner-----	Lodgepole pine-----	79	5	292	68	Lodgepole pine,
	Douglas-fir-----	49	5	223	67	Douglas-fir
560F:						
Elve-----	Lodgepole pine-----	42	2	60	33	Lodgepole pine
580F:						
Garlet-----	Lodgepole pine-----	77	5	275	66	Lodgepole pine,
	Douglas-fir-----	45	4	196	60	Douglas-fir
Elkner-----	Lodgepole pine-----	79	5	292	68	Lodgepole pine,
	Douglas-fir-----	49	5	223	67	Douglas-fir
603A:						
Havre-----	Plains cottonwood-----	80	---	---	---	Plains cottonwood
Glendive-----	Plains cottonwood-----	50	---	---	---	Plains cottonwood
630E:						
Crow-----	Ponderosa pine-----	82	5	246	72	Ponderosa pine,
	Douglas-fir-----	46	4	203	62	Douglas-fir
Lubrecht-----	Ponderosa pine-----	72	5	188	58	Ponderosa pine,
	Douglas-fir-----	43	4	182	57	Douglas-fir
650D:						
Laceycreek-----	Ponderosa pine-----	78	5	220	65	Ponderosa pine,
	Douglas-fir-----	45	5	196	60	Douglas-fir
Ambrant-----	Douglas-fir-----	51	5	237	71	Ponderosa pine,
	Ponderosa pine-----	81	5	239	70	Douglas-fir

Forest Land Productivity--Continued

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that data were not available)

Map symbol and soil name	Common trees	Site index	Produc- tivity class	Board feet	Cubic feet	Trees that stands are commonly managed for--
650F:						
Laceycreek-----	Ponderosa pine-----	78	5	220	65	Ponderosa pine,
	Douglas-fir-----	45	5	196	60	Douglas-fir
Eaglecreek-----	Ponderosa pine-----	70	5	178	55	Ponderosa pine,
	Douglas-fir-----	42	4	174	55	Douglas-fir
654F:						
Fleak-----	Ponderosa pine-----	42	2	65	31	Ponderosa pine
680F:						
Winkler-----	Ponderosa pine-----	72	5	188	58	Ponderosa pine,
	Douglas-fir-----	46	4	203	62	Douglas-fir
Ambrant-----	Douglas-fir-----	51	5	237	71	Ponderosa pine,
	Ponderosa pine-----	81	5	239	70	Douglas-fir
Winkler-----	Douglas-fir-----	42	4	174	55	Ponderosa pine,
	Ponderosa pine-----	68	4	167	53	Douglas-fir
895F:						
Whitlash-----	Ponderosa pine-----	44	2	70	33	---

Main Forest Access Road Limitations and Hazards

(Only map units containing a forested component are listed. See text for a description and criteria of the limitations and hazards listed in this table.)

Soil name and map symbol	Forest access road limitations or hazards
99:	
Rivra-----	Flooding
Hanly-----	Flooding
130A:	
Nesda-----	Flooding
Nesda-----	Flooding
McIlwaine-----	Flooding
	Low soil strength
460:	
Laceycreek-----	Low soil strength
530F:	
Warwood-----	Low soil strength
	Slope
	Erosion by water
550F:	
Libeg-----	Low soil strength
	Slope
	Erosion by water
Arrowpeak-----	Depth to rock
	Slope
Elkner-----	Slope
560F:	
Elve-----	Areas of rock outcrop
	Slope
Rock outcrop-----	Nonsoil material
580F:	
Garlet-----	Low soil strength
	Slope
	Erosion by water
Elkner-----	Slope
603A:	
Havre-----	Flooding
	Low soil strength
Glendive-----	Flooding
	Low soil strength
630E:	
Crow-----	Low soil strength
	Shrink swell potential
	Erosion by water
Lubrecht-----	Low soil strength
	Shrink swell potential
	Erosion by water

Main Forest Access Road Limitations and Hazards--Continued

(Only map units containing a forested component are listed. See text for a description and criteria of the limitations and hazards listed in this table)

Soil name and map symbol	Forest access road limitations or hazards
650D:	
Laceycreek-----	Low soil strength
Ambrant-----	None
650F:	
Laceycreek-----	Low soil strength
Eaglecreek-----	Depth to rock Low soil strength Slope Erosion by water
654F:	
Fleak-----	Areas of rock outcrop Slope Erosion by water
Twilight-----	Areas of rock outcrop Slope
Rock outcrop-----	Nonsoil material
680F:	
Winkler-----	Slope
Ambrant-----	Slope Erosion by water
Winkler-----	Slope
895F:	
Belain-----	Depth to rock Low soil strength Slope Erosion by water
Whitlash-----	Depth to rock Low soil strength Slope Erosion by water
Hedoes-----	Low soil strength Slope Erosion by water

Recreation

The soils of the survey area are rated in the table "Recreational Development" according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, the ability of the soil to support vegetation, access to water, potential water impoundment sites, and either access to public sewer lines or the capacity of the soil to absorb septic tank effluent. Soils subject to flooding are limited, in varying degrees, for recreational uses by the duration of flooding and the season when it occurs. Onsite assessment of the height, duration, intensity, and frequency of flooding is essential in planning recreational facilities.

Camp areas are tracts of land used intensively as sites for tents, trailers, and campers and for outdoor activities that accompany such sites. These areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The soils are rated on the basis of soil properties that influence the ease of developing camp areas and performance of the areas after development. Also considered are the soil properties that influence trafficability and promote the growth of vegetation after heavy use.

Picnic areas are natural or landscaped tracts of land that are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The soils are rated on the basis of soil properties that influence the cost of shaping the site, trafficability, and the growth of vegetation after development. The surface of picnic areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry.

Playgrounds are areas used intensively for baseball, football, or similar activities. These areas require a

nearly level soil that is free of stones and that can withstand heavy foot traffic and maintain an adequate cover of vegetation. The soils are rated on the basis of soil properties that influence the cost of shaping the site, trafficability, and the growth of vegetation. Slope and stoniness are the main concerns in developing playgrounds. The surface of the playgrounds should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry.

Paths and trails, are areas used for hiking and horseback riding. The areas should require little or no cutting and filling during site preparation. The soils are rated on the basis of soil properties that influence trafficability and erodibility. Paths and trails should remain firm under foot traffic and not be dusty when dry.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

The interpretative ratings in this table help engineers, planners, and others to understand how soil properties influence recreational uses. Ratings for proposed uses are given in terms of limitations. Only the most restrictive features are listed. Other features may limit a specific recreational use.

The degree of soil limitation is expressed as slight, moderate, or severe.

Slight means that soil properties are favorable for the rated use. The limitations are minor and can be easily overcome. Good performance and low maintenance are expected.

Moderate means that soil properties are moderately favorable for the rated use. The limitations can be overcome or modified by special planning, design, or maintenance. During some part of the year, the expected performance may be less desirable than that of soils rated *slight*.

Severe means that soil properties are unfavorable for the rated use. Examples of limitations are slope, bedrock near the surface, flooding, and a seasonal high water table. These limitations generally require major soil reclamation, special design, or intensive maintenance. Overcoming the limitations generally is difficult and costly.

The information in the table "Recreational Development" can be supplemented by other information in this survey, for example, interpretations for dwellings without basements and for local roads and streets in the table "Building Site Development" and interpretations for septic tank absorption fields in the table "Sanitary Facilities."

Recreational Development

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
2: Riverwash-----					
2B: Marcott-----	Moderate: wetness, excess salt	Moderate: wetness, excess salt	Moderate: slope, wetness, excess salt	Slight	Moderate: excess salt, droughty
Big sandy-----	Severe: flooding, wetness, excess salt	Severe: excess salt	Severe: wetness, excess salt	Moderate: wetness	Severe: excess salt, droughty
12C: Beaverton-----	Severe: large stones	Severe: large stones	Severe: large stones, small stones	Moderate: large stones	Severe: large stones, droughty
Beaverton-----	Moderate: small stones	Moderate: small stones	Severe: small stones	Slight	Moderate: small stones, large stones, droughty
13C: Tanna-----	Slight	Slight	Moderate: slope, depth to rock	Slight	Moderate: depth to rock
15E: Lambeth-----	Severe: slope	Severe: slope	Severe: slope	Severe: erodes easily	Severe: slope
15F: Lambeth-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope
16B: Degrand-----	Moderate: dusty	Moderate: dusty	Moderate: slope, small stones, dusty	Moderate: dusty	Slight
17B: Delpoint-----	Moderate: dusty	Moderate: dusty	Moderate: slope, depth to rock, dusty	Moderate: dusty	Moderate: depth to rock
21E: Cabbart-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: slope, depth to rock
Delpoint-----	Severe: slope	Severe: slope	Severe: slope	Severe: erodes easily	Severe: slope

Recreational Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
22F: Hillon-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope
27B: Attewan-----	Moderate: dusty	Moderate: dusty	Moderate: slope, small stones, dusty	Moderate: dusty	Slight
28: Nishon-----	Severe: flooding, ponding	Severe: ponding	Severe: ponding	Severe: ponding	Severe: ponding
30B: Marvan-----	Moderate: percs slowly, too clayey	Moderate: too clayey, percs slowly	Moderate: slope, too clayey, percs slowly	Moderate: too clayey	Severe: too clayey
30C: Marvan-----	Moderate: percs slowly, too clayey	Moderate: too clayey, percs slowly	Severe: slope	Moderate: too clayey	Severe: too clayey
31A: Ferd-----	Moderate: dusty	Moderate: dusty	Moderate: dusty	Moderate: dusty	Slight
32B: Kobase-----	Slight	Slight	Moderate: slope	Slight	Slight
32C: Kobase-----	Slight	Slight	Severe: slope	Slight	Slight
32D: Kobase-----	Moderate: slope	Moderate: slope	Severe: slope	Severe: erodes easily	Moderate: slope
33A: Phillips-----	Moderate: dusty	Moderate: dusty	Moderate: small stones, dusty	Moderate: dusty	Slight
34A: Linnet-----	Moderate: too clayey	Moderate: too clayey	Moderate: small stones, too clayey	Moderate: too clayey	Severe: too clayey
35B: Assinniboine----	Slight	Slight	Moderate: slope, small stones	Slight	Slight
36B: Chinook-----	Slight	Slight	Moderate: slope, small stones	Slight	Slight

Recreational Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
36C: Chinook-----	Slight	Slight	Severe: slope	Slight	Slight
37B: Evanston-----	Moderate: dusty	Moderate: dusty	Moderate: slope, dusty	Moderate: dusty	Slight
37C: Evanston-----	Moderate: dusty	Moderate: dusty	Severe: slope	Moderate: dusty	Slight
38B: Ethridge-----	Slight	Slight	Moderate: slope	Slight	Slight
39B: Assinniboine----	Moderate: dusty	Moderate: dusty	Moderate: slope, small stones, dusty	Moderate: dusty	Slight
43A: Pendroy-----	Moderate: percs slowly, too clayey	Moderate: too clayey, percs slowly	Moderate: too clayey, percs slowly	Moderate: too clayey	Severe: too clayey
44B: Kevin-----	Slight	Slight	Moderate: slope, small stones	Slight	Slight
47B: Marias-----	Moderate: percs slowly, too clayey	Moderate: too clayey, percs slowly	Moderate: slope, too clayey, percs slowly	Moderate: too clayey	Severe: too clayey
47C: Marias-----	Moderate: percs slowly, too clayey	Moderate: too clayey, percs slowly	Severe: slope	Moderate: too clayey	Severe: too clayey
48A: Vanda-----	Moderate: percs slowly, too clayey, excess salt	Moderate: too clayey, excess salt, percs slowly	Moderate: too clayey, percs slowly, excess salt	Moderate: too clayey	Severe: too clayey
48C: Vanda-----	Moderate: percs slowly, too clayey, excess salt	Moderate: too clayey, excess salt, percs slowly	Moderate: slope, too clayey, percs slowly	Moderate: too clayey	Severe: too clayey
50A: Telstad-----	Moderate: dusty	Moderate: dusty	Moderate: small stones, dusty	Moderate: dusty	Slight

Recreational Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
55B: Lihen-----	Moderate: too sandy	Moderate: too sandy	Moderate: slope, small stones, too sandy	Moderate: too sandy	Moderate: droughty
56A: Scobey-----	Slight	Slight	Moderate: small stones	Slight	Slight
57B: Absarokee-----	Slight	Slight	Moderate: slope, depth to rock	Slight	Moderate: depth to rock
57C: Absarokee-----	Slight	Slight	Severe: slope	Slight	Moderate: depth to rock
57E: Absarokee-----	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
Reeder-----	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
58B: Lonna-----	Slight	Slight	Moderate: slope	Slight	Slight
58C: Lonna-----	Slight	Slight	Severe: slope	Slight	Slight
60A: Havre-----	Severe: flooding	Moderate: dusty	Moderate: dusty	Moderate: dusty	Slight
63: Lardell-----	Severe: flooding, wetness, excess salt	Severe: excess salt	Severe: wetness, excess salt	Moderate: wetness, too clayey	Severe: excess salt, too clayey
67B: Bearpaw-----	Slight	Slight	Moderate: slope, small stones	Slight	Slight
67C: Bearpaw-----	Slight	Slight	Severe: slope	Slight	Slight
68B: Gerber-----	Moderate: too clayey	Moderate: too clayey	Moderate: slope, too clayey	Moderate: too clayey	Severe: too clayey
69C: Vida-----	Slight	Slight	Moderate: slope, small stones	Slight	Moderate: large stones

Recreational Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
69C: (cont.)					
Zahill-----	Slight	Slight	Moderate: slope, small stones	Slight	Moderate: large stones
71D:					
Roy-----	Severe: large stones, small stones	Severe: large stones, small stones	Severe: large stones, slope, small stones	Moderate: large stones	Severe: small stones, large stones
72F:					
Zahill-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope
73B:					
Yetull-----	Moderate: too sandy	Moderate: too sandy	Moderate: slope, too sandy	Moderate: too sandy	Moderate: droughty
Lonesome-----	Moderate: too sandy	Moderate: too sandy	Moderate: slope, too sandy	Moderate: too sandy	Moderate: droughty
74C:					
Shambo-----	Slight	Slight	Moderate: slope	Slight	Slight
75B:					
Farnuf-----	Slight	Slight	Moderate: slope, small stones	Slight	Slight
75C:					
Farnuf-----	Slight	Slight	Severe: slope	Slight	Slight
76C:					
Hedoes-----	Slight	Slight	Moderate: slope, small stones	Slight	Moderate: large stones
77F:					
Tinsley-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: droughty, slope
79B:					
Yamacall-----	Moderate: dusty	Moderate: dusty	Moderate: slope, small stones, dusty	Moderate: dusty	Slight
79C:					
Yamacall-----	Moderate: dusty	Moderate: dusty	Severe: slope	Moderate: dusty	Slight

Recreational Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
79D: Yamacall-----	Moderate: slope, dusty	Moderate: slope, dusty	Severe: slope	Severe: erodes easily	Moderate: slope
81A: Glendive-----	Severe: flooding	Slight	Slight	Slight	Slight
82B: Savage-----	Slight	Slight	Moderate: slope	Slight	Slight
86B: Work-----	Slight	Slight	Moderate: slope, small stones	Slight	Slight
86C: Work-----	Slight	Slight	Severe: slope	Slight	Slight
86D: Work-----	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope
87B: Tamaneen-----	Slight	Slight	Moderate: slope, small stones	Slight	Slight
88C: Perma-----	Moderate: small stones	Moderate: small stones	Severe: small stones	Slight	Moderate: small stones, large stones, droughty
90A: Harlake-----	Severe: flooding	Moderate: too clayey	Moderate: too clayey	Moderate: too clayey	Severe: too clayey
92E: Sunburst-----	Severe: slope	Severe: slope	Severe: slope	Severe: erodes easily	Severe: slope
Bascovy-----	Severe: slope	Severe: slope	Severe: slope	Severe: erodes easily	Severe: slope, too clayey
93F: Yetull-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
94B: Busby-----	Slight	Slight	Moderate: slope	Slight	Slight
94C: Busby-----	Slight	Slight	Severe: slope	Slight	Slight

Recreational Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
94D: Busby-----	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope
96B: Macar-----	Slight	Slight	Moderate: slope	Slight	Slight
96C: Macar-----	Slight	Slight	Severe: slope	Slight	Slight
98B: Kremlin-----	Moderate: dusty	Moderate: dusty	Moderate: slope, dusty	Moderate: dusty	Slight
98C: Kremlin-----	Moderate: dusty	Moderate: dusty	Severe: slope	Moderate: dusty	Slight
99: Rivra-----	Severe: flooding	Slight	Moderate: small stones, flooding	Slight	Severe: droughty
Hanly-----	Severe: flooding	Slight	Moderate: flooding	Slight	Moderate: droughty, flooding
110C: Laceycreek-----	Slight	Slight	Moderate: slope, small stones	Slight	Slight
110D: Laceycreek-----	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope
110E: Laceycreek-----	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
130A: Nesda-----	Severe: flooding	Slight	Moderate: small stones, flooding	Slight	Moderate: droughty, flooding
Nesda-----	Severe: flooding, small stones	Severe: small stones	Severe: small stones	Severe: small stones	Severe: small stones, droughty
McIlwaine-----	Severe: flooding	Slight	Moderate: small stones, flooding	Slight	Moderate: droughty, flooding
140A: Klayent-----	Severe: flooding, wetness	Moderate: wetness, percs slowly	Severe: wetness	Moderate: wetness	Moderate: wetness

Recreational Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
141B:					
Megonot-----	Slight	Slight	Moderate: slope, small stones, depth to rock	Slight	Moderate: depth to rock
Weingart-----	Severe: excess sodium	Severe: excess sodium	Severe: excess sodium	Slight	Severe: excess sodium
Delpoint-----	Moderate: dusty	Moderate: dusty	Moderate: slope, depth to rock, dusty	Moderate: dusty	Moderate: depth to rock
142C:					
Megonot-----	Slight	Slight	Moderate: slope, small stones, depth to rock	Slight	Moderate: depth to rock
Kobase-----	Slight	Slight	Moderate: slope	Slight	Slight
Delpoint-----	Moderate: dusty	Moderate: dusty	Moderate: slope, depth to rock, dusty	Moderate: dusty	Moderate: depth to rock
160A:					
Bigsandy-----	Severe: flooding, wetness	Moderate: wetness, percs slowly	Severe: wetness	Moderate: wetness	Moderate: wetness, flooding
171C:					
Delpoint-----	Moderate: dusty	Moderate: dusty	Moderate: slope, depth to rock, dusty	Moderate: dusty	Moderate: depth to rock
Cabbart-----	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Moderate: dusty	Severe: depth to rock
180A:					
McIlwaine-----	Severe: flooding	Slight	Moderate: small stones	Slight	Moderate: droughty
Nesda-----	Severe: flooding	Moderate: small stones	Severe: small stones	Slight	Moderate: small stones, droughty
Straw-----	Severe: flooding	Slight	Moderate: small stones	Slight	Slight
182F:					
Megonot-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope

Recreational Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
182F: (cont.)					
Yawdim-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock
200:					
Badland-----					
201F:					
Cabba-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock
Wayden-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock
Rock outcrop---					
210C:					
Shane-----	Moderate: percs slowly	Moderate: percs slowly	Moderate: slope, depth to rock, percs slowly	Slight	Moderate: depth to rock
Gerber-----	Moderate: too clayey	Moderate: too clayey	Moderate: slope, too clayey	Moderate: too clayey	Severe: too clayey
210E:					
Shane-----	Severe: slope	Severe: slope	Severe: slope	Severe: erodes easily	Severe: slope
Barkof-----	Severe: slope	Severe: slope	Severe: slope	Severe: erodes easily	Severe: slope, too clayey
Gerber-----	Moderate: slope, too clayey	Moderate: too clayey	Severe: slope	Moderate: too clayey	Severe: too clayey
211F:					
Cabbart-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock
Yawdim-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock
Rock outcrop---					
212F:					
Cabbart-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock
Hillon-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope

Recreational Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
221E:					
Hillon-----	Severe: slope	Severe: slope	Severe: slope	Severe: erodes easily	Severe: slope
Kevin-----	Moderate: slope	Moderate: slope	Severe: slope	Severe: erodes easily	Moderate: slope
222D:					
Hillon-----	Severe: slope	Severe: slope	Severe: slope	Severe: erodes easily	Severe: slope
Delpoint-----	Severe: slope	Severe: slope	Severe: slope	Severe: erodes easily	Severe: slope
223E:					
Hillon-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope
Fleak-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope	Severe: slope, depth to rock
224E:					
Hillon-----	Severe: slope	Severe: slope	Severe: slope	Severe: erodes easily	Severe: slope
Joplin-----	Moderate: slope, dusty	Moderate: slope, dusty	Severe: slope	Severe: erodes easily	Moderate: slope
227F:					
Hillon-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope
Fleak-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope	Severe: slope, depth to rock
Rock outcrop.					
229E:					
Hillon-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope
Lambeth-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope
232A:					
Acel-----	Slight	Slight	Slight	Slight	Slight
251C:					
Bascovy-----	Moderate: percs slowly, too clayey	Moderate: too clayey, percs slowly	Moderate: slope, small stones, too clayey	Moderate: too clayey	Severe: too clayey

Recreational Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
251C: (cont.)					
Neldore-----	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Moderate: too clayey	Severe: depth to rock, too clayey
251E:					
Bascovy-----	Severe: slope	Severe: slope	Severe: slope	Severe: erodes easily	Severe: slope, too clayey
Neldore-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Moderate: too clayey, slope	Severe: slope, depth to rock, too clayey
252C:					
Bascovy-----	Moderate: percs slowly, too clayey	Moderate: too clayey, percs slowly	Moderate: slope, small stones, too clayey	Moderate: too clayey	Severe: too clayey
Marvan-----	Moderate: percs slowly, too clayey	Moderate: too clayey, percs slowly	Moderate: slope, too clayey, percs slowly	Moderate: too clayey	Severe: too clayey
261B:					
Absher-----	Severe: excess sodium	Severe: excess sodium	Severe: excess sodium	Moderate: too clayey	Severe: excess sodium, too clayey
Nobe-----	Moderate: percs slowly, too clayey, excess salt	Moderate: too clayey, excess salt, percs slowly	Moderate: slope, too clayey, percs slowly	Moderate: too clayey	Severe: too clayey
263A:					
Toston-----	Severe: flooding, excess sodium	Severe: excess sodium	Severe: excess sodium	Slight	Severe: excess sodium
264A:					
Toston-----	Severe: flooding, excess sodium	Severe: excess sodium	Severe: excess sodium	Slight	Severe: excess sodium
Nobe-----	Severe: flooding	Moderate: too clayey, excess salt, percs slowly	Moderate: too clayey, percs slowly, excess salt	Moderate: too clayey	Severe: too clayey
265B:					
Absher-----	Severe: excess sodium	Severe: excess sodium	Severe: excess sodium	Moderate: too clayey	Severe: excess sodium, too clayey
Gerdrum-----	Severe: excess sodium	Severe: excess sodium	Severe: excess sodium	Slight	Severe: excess sodium

Recreational Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
272C:					
Attewan-----	Moderate: dusty	Moderate: dusty	Moderate: slope, small stones, dusty	Moderate: dusty	Slight
Tinsley-----	Moderate: small stones	Moderate: small stones	Severe: small stones	Slight	Severe: droughty
301A:					
Marvan-----	Moderate: percs slowly, too clayey	Moderate: too clayey, percs slowly	Moderate: too clayey, percs slowly	Moderate: too clayey	Severe: too clayey
Vanda-----	Moderate: percs slowly, too clayey, excess salt	Moderate: too clayey, excess salt, percs slowly	Moderate: too clayey, percs slowly, excess salt	Moderate: too clayey	Severe: too clayey
301C:					
Marvan-----	Moderate: percs slowly, too clayey	Moderate: too clayey, percs slowly	Moderate: slope, too clayey, percs slowly	Moderate: too clayey	Severe: too clayey
Vanda-----	Moderate: percs slowly, too clayey, excess salt	Moderate: too clayey, excess salt, percs slowly	Moderate: slope, too clayey, percs slowly	Moderate: too clayey	Severe: too clayey
303A:					
Flatcreek-----	Severe: flooding	Moderate: too clayey, percs slowly	Moderate: too clayey, flooding, percs slowly	Moderate: too clayey	Severe: too clayey
Nobe-----	Severe: flooding	Moderate: too clayey, excess salt, percs slowly	Moderate: too clayey, flooding, percs slowly	Moderate: too clayey	Severe: too clayey
305A:					
Marvan-----	Moderate: percs slowly, too clayey, excess salt	Moderate: too clayey, excess salt, percs slowly	Moderate: too clayey, percs slowly, excess salt	Moderate: too clayey	Severe: too clayey
Nobe-----	Moderate: percs slowly, too clayey, excess salt	Moderate: too clayey, excess salt, percs slowly	Moderate: too clayey, percs slowly, excess salt	Moderate: too clayey	Severe: too clayey
311B:					
Ferd-----	Moderate: dusty	Moderate: dusty	Moderate: slope, dusty	Moderate: dusty	Slight
Creed-----	Severe: excess sodium	Severe: excess sodium	Severe: excess sodium	Moderate: dusty	Severe: excess sodium

Recreational Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
311B: (cont.)					
Gerdrum-----	Severe: excess sodium	Severe: excess sodium	Severe: excess sodium	Slight	Severe: excess sodium
311C:					
Ferd-----	Moderate: dusty	Moderate: dusty	Severe: slope	Moderate: dusty	Slight
Creed-----	Severe: excess sodium	Severe: excess sodium	Severe: slope, excess sodium	Moderate: dusty	Severe: excess sodium
Gerdrum-----	Severe: excess sodium	Severe: excess sodium	Severe: slope, excess sodium	Slight	Severe: excess sodium
323B:					
Sagedale-----	Slight	Slight	Moderate: slope	Slight	Slight
323C:					
Sagedale-----	Slight	Slight	Severe: slope	Slight	Slight
324B:					
Marcott-----	Moderate: wetness	Moderate: wetness	Moderate: wetness	Slight	Slight
331B:					
Phillips-----	Moderate: dusty	Moderate: dusty	Moderate: slope, small stones, dusty	Moderate: dusty	Slight
Elloam-----	Severe: excess sodium	Severe: excess sodium	Severe: excess sodium	Slight	Severe: excess sodium
331C:					
Phillips-----	Moderate: dusty	Moderate: dusty	Severe: slope	Moderate: dusty	Slight
Elloam-----	Severe: excess sodium	Severe: excess sodium	Severe: slope, excess sodium	Slight	Severe: excess sodium
334B:					
Phillips-----	Moderate: dusty	Moderate: dusty	Moderate: small stones, dusty	Moderate: dusty	Slight
Kevin-----	Slight	Slight	Moderate: slope, small stones	Slight	Slight
341B:					
Linnet-----	Moderate: too clayey	Moderate: too clayey	Moderate: small stones, too clayey	Moderate: too clayey	Severe: too clayey

Recreational Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
341B: (cont.)					
Marias-----	Moderate: percs slowly, too clayey	Moderate: too clayey, percs slowly	Moderate: slope, too clayey, percs slowly	Moderate: too clayey	Severe: too clayey
351B:					
Kenilworth-----	Slight	Slight	Slight	Slight	Slight
Fortbenton-----	Slight	Slight	Slight	Slight	Slight
361B:					
Fortbenton-----	Slight	Slight	Moderate: slope	Slight	Slight
362C:					
Chinook-----	Slight	Slight	Severe: slope	Slight	Slight
Yetull-----	Moderate: too sandy	Moderate: too sandy	Severe: slope	Moderate: too sandy	Moderate: droughty
363B:					
Cozberg-----	Slight	Slight	Moderate: slope	Slight	Slight
Chinook-----	Slight	Slight	Moderate: slope, small stones	Slight	Slight
363C:					
Chinook-----	Slight	Slight	Severe: slope	Slight	Slight
Lihe-----	Slight	Slight	Severe: slope	Slight	Moderate: droughty
364B:					
Chinook-----	Moderate: dusty	Moderate: dusty	Moderate: slope, small stones, dusty	Moderate: dusty	Slight
364C:					
Chinook-----	Moderate: dusty	Moderate: dusty	Severe: slope	Moderate: dusty	Slight
365B:					
Fortbenton-----	Slight	Slight	Moderate: slope	Slight	Slight
Chinook-----	Slight	Slight	Moderate: slope, small stones	Slight	Slight
368C:					
Fortbenton-----	Slight	Slight	Moderate: slope	Slight	Slight

Recreational Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
368C: (cont.)					
Hillon-----	Moderate: dusty	Moderate: dusty	Moderate: slope, small stones, dusty	Moderate: dusty	Slight
372C:					
Evanston-----	Moderate: dusty	Moderate: dusty	Moderate: slope, dusty	Moderate: dusty	Slight
Yamacall-----	Moderate: dusty	Moderate: dusty	Moderate: slope, small stones, dusty	Moderate: dusty	Slight
375B:					
Evanston-----	Moderate: dusty	Moderate: dusty	Moderate: slope, dusty	Moderate: dusty	Slight
Lonna-----	Moderate: dusty	Moderate: dusty	Moderate: slope, dusty	Moderate: dusty	Slight
377B:					
Evanston-----	Moderate: dusty	Moderate: dusty	Moderate: slope, dusty	Moderate: dusty	Slight
Degrad-----	Moderate: dusty	Moderate: dusty	Moderate: slope, small stones, dusty	Moderate: dusty	Slight
381B:					
Ethridge-----	Slight	Slight	Moderate: slope	Slight	Slight
385B:					
Ethridge-----	Slight	Slight	Slight	Slight	Slight
Kobase-----	Slight	Slight	Moderate: slope	Slight	Slight
386B:					
Ethridge-----	Slight	Slight	Slight	Slight	Slight
Evanston-----	Moderate: dusty	Moderate: dusty	Moderate: slope, dusty	Moderate: dusty	Slight
388A:					
Ethridge-----	Slight	Slight	Slight	Slight	Slight
Lonna-----	Slight	Slight	Slight	Slight	Slight

Recreational Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
402A:					
Gerdum-----	Severe: excess sodium	Severe: excess sodium	Severe: excess sodium	Slight	Severe: excess sodium
Absher-----	Severe: excess sodium	Severe: excess sodium	Severe: excess sodium	Moderate: too clayey	Severe: excess sodium, too clayey
Creed-----	Severe: excess sodium	Severe: excess sodium	Severe: excess sodium	Moderate: dusty	Severe: excess sodium
410:					
Rock outcrop---					
Fleak-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope	Severe: slope, depth to rock
411D:					
Farnuf-----	Slight	Slight	Severe: slope	Slight	Slight
Reeder-----	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope, depth to rock
411E:					
Reeder-----	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
Farnuf-----	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope
421C:					
Joplin-----	Moderate: dusty	Moderate: dusty	Moderate: slope, dusty	Moderate: dusty	Slight
Hillon-----	Moderate: dusty	Moderate: dusty	Moderate: slope, small stones, dusty	Moderate: dusty	Slight
422C:					
Marmarth-----	Moderate: dusty	Moderate: dusty	Moderate: slope, depth to rock, dusty	Moderate: dusty	Moderate: depth to rock
441C:					
Kevin-----	Slight	Slight	Moderate: slope, small stones	Slight	Slight
Hillon-----	Slight	Slight	Moderate: slope, small stones	Slight	Slight
442C:					
Kevin-----	Slight	Slight	Moderate: slope, small stones	Slight	Slight

Recreational Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
442C: (cont.)					
Elloam-----	Severe: excess sodium	Severe: excess sodium	Severe: excess sodium	Slight	Severe: excess sodium
444D:					
Kevin-----	Moderate: slope	Moderate: slope	Severe: slope	Severe: erodes easily	Moderate: slope
Scobey-----	Moderate: slope	Moderate: slope	Severe: slope	Severe: erodes easily	Moderate: slope
451C:					
Turner-----	Slight	Slight	Moderate: slope, small stones	Slight	Moderate: large stones
Beaverton-----	Severe: large stones	Severe: large stones	Severe: large stones, small stones	Moderate: large stones	Severe: large stones, droughty
Beaverton-----	Moderate: small stones	Moderate: small stones	Severe: small stones	Slight	Moderate: small stones, large stones, droughty
460:					
Laceycreek-----	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
471B:					
Marias-----	Moderate: percs slowly, too clayey	Moderate: too clayey, percs slowly	Moderate: slope, too clayey, percs slowly	Moderate: too clayey	Severe: too clayey
Kobase-----	Slight	Slight	Moderate: slope	Slight	Slight
481A:					
Bigsag-----	Severe: flooding, wetness, percs slowly	Severe: too clayey, excess sodium, excess salt	Severe: too clayey, wetness, percs slowly	Severe: too clayey	Severe: excess salt, excess sodium, too clayey
493A:					
Enbar-----	Severe: flooding	Slight	Moderate: small stones, flooding	Slight	Moderate: flooding
Straw-----	Severe: flooding	Slight	Slight	Slight	Slight
Eagleton-----	Severe: flooding, wetness	Moderate: wetness	Severe: wetness	Moderate: wetness	Moderate: wetness, flooding
503B:					
Telstad-----	Moderate: dusty	Moderate: dusty	Moderate: slope, small stones, dusty	Moderate: dusty	Slight

Recreational Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
503B: (cont.)					
Joplin-----	Moderate: dusty	Moderate: dusty	Moderate: slope, dusty	Moderate: dusty	Slight
503C:					
Telstad-----	Moderate: dusty	Moderate: dusty	Severe: slope	Moderate: dusty	Slight
Joplin-----	Moderate: dusty	Moderate: dusty	Severe: slope	Moderate: dusty	Slight
510:					
Rock outcrop---					
Belain-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
511A:					
Martinsdale----	Slight	Slight	Moderate: small stones	Slight	Slight
Turner-----	Slight	Slight	Moderate: small stones	Slight	Moderate: large stones
511C:					
Martinsdale----	Slight	Slight	Moderate: slope, small stones	Slight	Slight
512C:					
Martinsdale----	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: large stones, slope
521B:					
Thoeny-----	Severe: excess sodium	Severe: excess sodium	Severe: excess sodium	Moderate: dusty	Severe: excess sodium
Elloam-----	Severe: excess sodium	Severe: excess sodium	Severe: excess sodium	Slight	Severe: excess sodium
Absher-----	Severe: excess sodium	Severe: excess sodium	Severe: excess sodium	Moderate: too clayey	Severe: excess sodium, too clayey
530F:					
Warwood-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope
531A:					
Sweetgrass-----	Slight	Slight	Moderate: small stones	Slight	Moderate: large stones, droughty
Beaverton-----	Severe: large stones	Severe: large stones	Severe: large stones, small stones	Moderate: large stones	Severe: large stones, droughty

Recreational Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
531C:					
Sweetgrass-----	Slight	Slight	Moderate: slope, small stones	Slight	Moderate: large stones, droughty
Beaverton-----	Severe: large stones	Severe: large stones	Severe: large stones, small stones	Moderate: large stones	Severe: large stones, droughty
Beaverton-----	Moderate: small stones	Moderate: small stones	Severe: small stones	Slight	Moderate: small stones, large stones, droughty
550F:					
Libeg-----	Severe: slope	Severe: slope	Severe: large stones, slope, small stones	Severe: slope	Severe: slope
Arrowpeak-----	Severe: slope, large stones, small stones	Severe: slope, large stones, small stones	Severe: large stones, slope, small stones	Severe: slope	Severe: small stones, large stones, slope
Elkner-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
551B:					
Lonesome-----	Moderate: too sandy	Moderate: too sandy	Moderate: slope, too sandy	Moderate: too sandy	Moderate: droughty
560F:					
Elve-----	Severe: slope, large stones, small stones	Severe: slope, large stones, small stones	Severe: large stones, slope, small stones	Severe: slope	Severe: small stones, droughty, slope
Rock outcrop----					
561B:					
Scobey-----	Slight	Slight	Moderate: slope, small stones	Slight	Slight
Kevin-----	Slight	Slight	Moderate: slope, small stones	Slight	Slight
561C:					
Scobey-----	Slight	Slight	Severe: slope	Slight	Slight
Kevin-----	Slight	Slight	Severe: slope	Slight	Slight
562B:					
Scobey-----	Slight	Slight	Moderate: slope, small stones	Slight	Slight

Recreational Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
562B: (cont.)					
Linnet-----	Moderate: too clayey	Moderate: too clayey	Moderate: small stones, too clayey	Moderate: too clayey	Severe: too clayey
563A:					
Fortbenton-----	Slight	Slight	Slight	Slight	Slight
Scobey-----	Slight	Slight	Slight	Slight	Slight
580F:					
Garlet-----	Severe: slope	Severe: slope	Severe: large stones, slope, small stones	Severe: slope	Severe: slope
Elkner-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
601A:					
Havre-----	Severe: flooding	Moderate: dusty	Moderate: dusty	Moderate: dusty	Slight
Glendive-----	Severe: flooding	Slight	Slight	Slight	Slight
602A:					
Havre-----	Severe: flooding	Slight	Slight	Slight	Slight
603A:					
Havre-----	Severe: flooding	Moderate: dusty	Moderate: flooding, dusty	Moderate: dusty	Moderate: flooding
Glendive-----	Severe: flooding	Slight	Moderate: flooding	Slight	Moderate: flooding
605C:					
Yamacall-----	Moderate: dusty	Moderate: dusty	Moderate: slope, small stones, dusty	Moderate: dusty	Slight
Havre-----	Severe: flooding	Moderate: dusty	Moderate: flooding, dusty	Moderate: dusty	Moderate: flooding
621E:					
Sagedale-----	Severe: slope	Severe: slope	Severe: slope	Severe: erodes easily	Severe: slope
Wayden-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: slope, depth to rock
621F:					
Wayden-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock

Recreational Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
621F: (cont.)					
Sagedale-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope
623F:					
Linwell-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Winifred-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
630E:					
Crow-----	Severe: slope	Severe: slope	Severe: slope	Severe: erodes easily	Severe: slope
Lubrecht-----	Severe: slope	Severe: slope	Severe: slope	Severe: erodes easily	Severe: slope
641F:					
Norbert-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock, too clayey
Barkof-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope, too clayey
650D:					
Laceycreek-----	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope
Ambrant-----	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: droughty, slope
650F:					
Laceycreek-----	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
Eaglecreek-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
653F:					
Fleak-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope	Severe: slope, depth to rock
Twilight-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Yetull-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
654F:					
Fleak-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope	Severe: slope, depth to rock

Recreational Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
654F: (cont.)					
Twilight-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Rock outcrop----					
661E:					
Twilight-----	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
Fleak-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Moderate: too sandy, slope	Severe: slope, depth to rock
671B:					
Bearpaw-----	Slight	Slight	Moderate: slope, small stones	Slight	Slight
Vida-----	Slight	Slight	Moderate: slope, small stones	Slight	Moderate: large stones
671C:					
Bearpaw-----	Slight	Slight	Severe: slope	Slight	Slight
Vida-----	Slight	Slight	Severe: slope	Slight	Moderate: large stones
673A:					
Bearpaw-----	Slight	Slight	Moderate: small stones	Slight	Slight
Daglum-----	Severe: excess sodium	Severe: excess sodium	Severe: excess sodium	Slight	Severe: excess sodium
674B:					
Bearpaw-----	Slight	Slight	Moderate: slope, small stones	Slight	Slight
Waltham-----	Severe: excess sodium	Severe: excess sodium	Severe: excess sodium	Slight	Severe: excess sodium
680F:					
Winkler-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
Ambrant-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Winkler-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
681C:					
Gerber-----	Moderate: too clayey	Moderate: too clayey	Severe: slope	Moderate: too clayey	Severe: too clayey

Recreational Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
691D:					
Vida-----	Moderate: slope	Moderate: slope	Severe: slope	Severe: erodes easily	Moderate: large stones, slope
Williams-----	Moderate: slope	Moderate: slope	Severe: slope	Severe: erodes easily	Moderate: slope
692D:					
Vida-----	Moderate: slope	Moderate: slope	Severe: slope	Severe: erodes easily	Moderate: large stones, slope
Bearpaw-----	Moderate: slope	Moderate: slope	Severe: slope	Severe: erodes easily	Moderate: slope
693C:					
Vida-----	Moderate: slope	Moderate: slope	Severe: slope	Severe: erodes easily	Moderate: large stones, slope
Bearpaw-----	Slight	Slight	Moderate: slope, small stones	Slight	Slight
Nishon-----	Severe: flooding, ponding	Severe: ponding	Severe: ponding	Severe: ponding	Severe: ponding
701E:					
Work-----	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope
Absarokee-----	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
702E:					
Work-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
Absarokee-----	Severe: slope	Severe: slope	Severe: slope	Moderate: large stones, slope	Severe: large stones, slope
721E:					
Zahill-----	Severe: slope	Severe: slope	Severe: slope	Severe: erodes easily	Severe: slope
Vida-----	Moderate: slope	Moderate: slope	Severe: slope	Severe: erodes easily	Moderate: large stones, slope
722F:					
Zahill-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope
Sagedale-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope

Recreational Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
722F: (cont.)					
Wayden-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock
723F:					
Zahill-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope
Cabba-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock
731F:					
Yetull-----	Severe: slope, too sandy	Severe: slope, too sandy	Severe: slope, too sandy	Severe: too sandy, slope	Severe: slope
Dune land-----					
741B:					
Shambo-----	Slight	Slight	Moderate: slope	Slight	Slight
Straw-----	Severe: flooding	Slight	Moderate: small stones, flooding	Slight	Moderate: flooding
745F:					
Shambo-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Amor-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Cabba-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock
761C:					
Hedoes-----	Slight	Slight	Moderate: slope, small stones	Slight	Moderate: large stones
Belain-----	Slight	Slight	Moderate: slope, small stones, depth to rock	Slight	Moderate: depth to rock
761E:					
Hedoes-----	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: large stones, slope
Belain-----	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
793B:					
Yamacall-----	Slight	Slight	Moderate: slope, small stones	Slight	Slight

Recreational Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
793C:					
Yamacall-----	Slight	Slight	Severe: slope	Slight	Slight
795C:					
Yamacall-----	Slight	Slight	Moderate: slope, small stones	Slight	Slight
Benz-----	Moderate: excess salt	Moderate: excess salt	Moderate: slope, excess salt	Slight	Moderate: excess salt, droughty
795D:					
Yamacall-----	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope
Benz-----	Moderate: slope, excess salt	Moderate: slope, excess salt	Severe: slope	Severe: erodes easily	Moderate: excess salt, droughty, slope
801B:					
Williams-----	Slight	Slight	Moderate: slope, small stones	Slight	Slight
Vida-----	Slight	Slight	Moderate: slope, small stones	Slight	Moderate: large stones
801C:					
Williams-----	Slight	Slight	Severe: slope	Slight	Slight
Vida-----	Slight	Slight	Severe: slope	Slight	Moderate: large stones
828A:					
Savage-----	Slight	Slight	Slight	Slight	Slight
842A:					
Savage-----	Slight	Slight	Slight	Slight	Slight
Daglum-----	Severe: excess sodium	Severe: excess sodium	Severe: excess sodium	Slight	Severe: excess sodium
863E:					
Work-----	Severe: slope	Severe: slope	Severe: large stones, slope, small stones	Moderate: slope	Severe: slope
Roy-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
871B:					
Tamaneen-----	Moderate: large stones	Moderate: large stones	Severe: large stones	Moderate: large stones	Severe: large stones

Recreational Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
871C:					
Tamaneen-----	Moderate: large stones	Moderate: large stones	Severe: large stones, slope	Moderate: large stones	Severe: large stones
883F:					
Perma-----	Severe: slope	Severe: slope	Severe: large stones, slope, small stones	Severe: slope	Severe: slope
Whitlash-----	Severe: slope, large stones, depth to rock	Severe: slope, large stones, depth to rock	Severe: large stones, slope, small stones	Severe: slope	Severe: large stones, slope, depth to rock
892F:					
Whitlash-----	Severe: slope, large stones, depth to rock	Severe: slope, large stones, depth to rock	Severe: large stones, slope, small stones	Severe: slope	Severe: large stones, slope, depth to rock
Belain-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Rock outcrop----					
895F:					
Belain-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Whitlash-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, small stones, depth to rock	Severe: slope	Severe: slope, depth to rock
Hedoes-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
896E:					
Belain-----	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
Whitlash-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, small stones, depth to rock	Moderate: slope	Severe: slope, depth to rock
Rock outcrop----					
911F:					
Belain-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Whitlash-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, small stones, depth to rock	Severe: slope	Severe: slope, depth to rock
Hedoes-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope

Recreational Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
916C:					
Belain-----	Slight	Slight	Moderate: slope, small stones, depth to rock	Slight	Moderate: depth to rock
Hedoes-----	Slight	Slight	Moderate: slope, small stones	Slight	Moderate: large stones
925F:					
Sunburst-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope
Lambeth-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope
941D:					
Busby-----	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope
Twilight-----	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope, depth to rock
943C:					
Tally-----	Slight	Slight	Moderate: slope, small stones	Slight	Slight
943E:					
Tally-----	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
Vebar-----	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
943F:					
Tally-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Cohagen-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope	Severe: slope, depth to rock
965F:					
Cabba-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock
Macar-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope
971F:					
Neldore-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope	Severe: slope, depth to rock, too clayey

Recreational Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
971F: (cont.)					
Bascovy-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope, too clayey
972F:					
Neldore-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope	Severe: slope, depth to rock, too clayey
Rock outcrop----					
974F:					
Neldore-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope	Severe: slope, depth to rock, too clayey
Hillon-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope

Wildlife Habitat

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. If food, cover, or water is missing, inadequate, or inaccessible, wildlife will be scarce or will not inhabit the area.

If the soils have potential for habitat development, wildlife habitat can be created or improved by planting appropriate vegetation, properly managing the existing plant cover, and fostering the natural establishment of desirable plants.

Elements of Wildlife Habitat

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants used by wildlife. Examples are wheat, rye, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes planted for wildlife food and cover. Examples are fescue, brome grass, timothy, orchardgrass, clover, alfalfa, trefoil, reed canarygrass, and crownvetch.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds, that provide food and cover for wildlife. Examples are bluestem, indiagrass, blueberry, goldenrod, lambsquarters, dandelions, blackberry, ragweed, wheatgrass, fescue, and nightshade.

The major soil properties affecting the growth of grain and forage crops and wild herbaceous plants are depth of the root zone, texture of the surface layer, the amount of water available to plants, wetness, salinity or sodicity, and flooding. The length of the growing season also is important.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage that wildlife eat. Examples are oak, poplar, boxelder, birch, maple, green ash, willow, and American elm. Examples of fruit-producing shrubs that are suitable for planting on soils that have good potential for these plants are hawthorn, honeysuckle, American plum, redosier dogwood, chokecherry, serviceberry, silver buffaloberry, and crabapple.

Coniferous plants are cone-bearing trees, shrubs, or ground cover that provide habitat or supply food in the form of browse, seed, or fruitlike cones. Examples are pine, spruce, hemlock, fir, yew, cedar, larch, and juniper.

The major soil properties affecting the growth of hardwood and coniferous trees and shrubs are depth of root zone, the amount of water available to plants, and wetness.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Wetland plants produce food or cover for wetland wildlife. Examples of these plants are smartweed, wild millet, rushes, sedges, bulrushes, wild rice, arrowhead, waterplantain, pickerelweed, and cattail.

The major soil properties affecting wetland plants are texture of the surface layer, wetness, acidity or alkalinity, and slope.

Shallow water areas have an average depth of less than 5 feet. They are useful as habitat for some wildlife species. They are naturally wet areas or are created by dams, levees, or water-control measures in marshes or streams. Examples are muskrat marshes, waterfowl feeding areas, wildlife watering developments, beaver ponds, and other wildlife ponds.

The major soil properties affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability.

Kinds of Wildlife Habitat

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, and shrubs. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include Hungarian partridge, pheasant, sharp-tailed grouse, sage grouse, meadowlark, field sparrow, killdeer, cottontail rabbit, and red fox.

Habitat for woodland wildlife consists of areas of hardwoods or conifers or a mixture of these and associated grasses, legumes, and wild herbaceous plants. The wildlife attracted to this habitat include wild

turkey, ruffed grouse, thrushes, woodpeckers, owls, tree squirrels, porcupine, raccoon, deer, elk, and black bear.

Habitat for wetland wildlife consists of open, marshy or swampy, shallow water areas that support water-tolerant plants. The wildlife attracted to this habitat include ducks, geese, herons, bitterns, rails, kingfishers, muskrat, otter, mink, and beaver.

Habitat for rangeland wildlife consists of areas of shrubs and wild herbaceous plants. The wildlife attracted to rangeland include antelope, deer, sage grouse, meadowlark, and lark bunting.

Wildlife Habitat of the Chouteau County Area

Wildlife is a product of the land. Soils influence wildlife populations primarily through the kinds of vegetation and other habitat components they support. The abundance of wildlife is directly related to the extent and diversity of habitat. Wildlife can be produced on almost all lands, but wildlife productivity is generally a function of the biotic potential of the soil. Species of wildlife are more readily associated with the plant communities that comprise their habitat than with specific soils. Together, plants and animals constitute natural communities that are governed by environmental influences, of which soil is but a part.

The quality and interspersion of habitat determines wildlife population levels. The suitability of a particular habitat for a wildlife species depends greatly on the nature of plant communities present, while the quantity, quality, and distribution of a particular habitat is determined by prevailing land use practices and management. These factors are governed to some extent by the soils of the area.

Rating soils for their ability to produce vegetative elements for wildlife habitat does not take into account local climatic influences, present use of soils, juxtaposition of habitat types or elements, or present distribution of wildlife species. For these reasons, the selection and suitability of an area for wildlife habitat development requires onsite evaluation.

Mountains, from rolling foothills to coniferous forest lands, grasslands, riparian forest lands, irrigated and nonirrigated cropland, streams and rivers, ponds, marshes, and reservoirs provide a diversity of habitats for the wildlife of the Chouteau County Area.

Although limited in the area, Rocky Mountain elk occur in the Bearpaw and Highwood Mountains of the northeastern and southern boundaries of the survey area. They winter in the foothills and spend their summers and falls at relatively high elevations with

lush forest land growth, interspersed with grassy mountain meadows.

Both white-tailed and mule deer are throughout the survey area. White-tail generally inhabit the flood plains and valleys of the Missouri, Teton, and Marias Rivers and their tributaries. Mule deer occur over much of the uplands, foothills, brushy flood plains, and broken rangelands of the survey area.

Pronghorn antelope occupy the prairie grasslands and nonirrigated cropland of the survey area, both north and south of the Missouri River.

Black bear inhabit the forest lands of the Bearpaw and Highwood Mountains. Most of their range occurs outside the survey area.

Mountain goats have been placed in the rugged terrain of Square Butte, their range is limited to Square Butte and the immediate area. Bighorn sheep inhabit the Missouri River breaks in the eastern-most part of the survey area, and the counties to the east.

The Missouri, Teton, and Marias River flood plains support habitat for ring-necked pheasants in the form of irrigated and dry cropland, brushy thickets, ditch banks, and fence rows. Grain fields, shelterbelts, and brushy drainageways provide good habitat in the uplands and foothills.

Gray or Hungarian partridge, an introduced bird from Europe, is associated with cropland and rangeland areas of the survey area. Gray partridge, like sharp-tailed grouse, exhibit population fluctuations that appear to result from changes in available habitat, weather, and possibly disease. Sharp-tailed grouse occur throughout the prairie uplands of the survey area where grain fields and brushy cover, with an abundance of fruit-bearing shrubs including chokecherry, plum, rose, snowberry, and buffaloberry, provide excellent habitat. Within these areas, grain fields, shelterbelts, windbreaks, brushy draws, and an intermix of shrubs, forbs, and grasses provide suitable habitat for these prairie species.

Sage grouse occur on sagebrush covered rangelands in the eastern part of the survey area, north of the Missouri River. Optimum sage grouse habitat is characterized by plant communities with big sagebrush, silver sagebrush, and a variety of forbs and grasses.

Although limited by the extent of their habitat, two species of woodland grouse, blue and ruffed, are in the coniferous and riparian forest lands of the survey area. The ruffed grouse is confined to riparian forest lands of the Highwood Mountains in the extreme southern portion of the survey area. The blue grouse is in the coniferous forest lands of both the Highwood and Bearpaw Mountains. A variety of habitat is important to

woodland grouse throughout the seasons of the year. Blue grouse winter at high elevations and descend to semi-open timber early in the spring for breeding, nesting, and rearing of chicks. Ruffed grouse inhabit dense cover of conifers and deciduous trees and shrubs, especially along stream courses. Blue grouse are closely associated with the distribution patterns of Douglas-fir and the true firs.

The Missouri River and the many ponds, reservoirs, marshes, and closed depressions throughout the survey area provide habitat for an abundance of waterfowl during both spring and fall migration, and during the summer production period. Migratory birds use riverine habitat for nesting, feeding, and loafing. Geese nest on the larger islands of the Missouri, and use sparsely vegetated sandbars as loafing and feeding areas.

Beaver, mink, and muskrat occur throughout the principal watercourses, while badgers, ground squirrels, coyotes, bobcats, and a variety of small mammals are throughout the survey area.

Populations of game and nongame species can be enhanced through application of conservation practices that improve habitat. Among these are development of odd or irregularly shaped areas in and adjacent to farmland, protection of such areas from fire and grazing, and the establishment of woody vegetation that provides winter shelter. Wildlife may also be enhanced through increased application of commonly employed conservation practices such as proper grazing, planned grazing systems, stripcropping, minimum tillage, field windbreaks, and the construction of ponds.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial,

industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the "Glossary."

Building Site Development

The table "Building Site Development" shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features generally are favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe*, if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and

observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills generally are limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, potential for frost action, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

The table "Sanitary Facilities" shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. It also shows the suitability of the soils for use as a daily cover for landfill.

Soil properties are important in selecting sites for sanitary facilities and in identifying limiting soil properties and site features to be considered in planning, design, and installation. Soil limitation ratings of *slight*, *moderate*, or *severe* are given for septic tank absorption fields, sewage lagoons, and trench and area sanitary landfills. Soil suitability ratings of *good*, *fair*, and *poor* are given for daily cover for landfill.

A rating of *slight* or *good* indicates that the soils have no limitations or that the limitations can be easily overcome. Good performance and low maintenance can be expected. A rating of *moderate* or *fair* indicates that the limitations should be recognized but generally can be overcome by good management or special design. A rating of *severe* or *poor* indicates that overcoming the limitations is difficult or impractical. Increased maintenance may be required.

Septic tank absorption fields are areas in which subsurface systems of tile or perforated pipe distribute effluent from a septic tank into the natural soil. The centerline of the tile is assumed to be at a depth of 24 inches. Only the part of the soil between depths of 24 and 60 inches is considered in making the ratings. The soil properties and site features considered are those that affect the absorption of the effluent, those that affect the construction and maintenance of the system, and those that may affect public health.

The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted, relatively impervious soil material. Aerobic lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Relatively impervious soil material for the lagoon floor and sides is desirable to minimize seepage and contamination of local ground water.

The table "Sanitary Facilities" gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Trench sanitary landfill is an area where solid waste is disposed of by placing refuse in successive layers in an excavated trench. The waste is spread, compacted, and covered daily with a thin layer of soil that is excavated from the trench. When the trench is full, a final cover of soil material at least 2 feet thick is placed over the landfill. Soil properties that influence the risk of pollution, the ease of excavation, trafficability, and revegetation are the major considerations in rating the soils.

Area sanitary landfill is an area where solid waste is disposed of by placing refuse in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil that is imported from a source away from the site. A final cover of soil at least 2 feet thick is placed over the completed landfill. Soil properties that influence trafficability, revegetation, and the risk of pollution are the main considerations in rating the soils for area sanitary landfills.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. The ratings in the table "Sanitary Facilities" are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste. The suitability of a soil for use as cover is based on properties that affect workability and the ease of digging, moving, and spreading the material over the refuse daily during both wet and dry periods.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Waste Management

Soil properties are important when organic waste is applied as fertilizer and wastewater is applied in irrigated areas. They also are important when the soil is used as a medium for the treatment and disposal of the organic waste and wastewater. Unfavorable soil properties can result in environmental damage.

The use of organic waste and wastewater as production resources results in energy and resource conservation and minimizes the problems associated

with waste disposal. If disposal is the goal, applying a maximum amount of the organic waste or the wastewater to a minimal area holds costs to a minimum and environmental damage is the main hazard. If reuse is the goal, a minimum amount should be applied to a maximum area and environmental damage is unlikely.

Interpretations developed for waste management may include ratings for manure- and food-processing waste, municipal sewage sludge, use of wastewater for irrigation, and treatment of wastewater by slow rate, overland flow, and rapid infiltration processes.

Specific information regarding waste management is available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Construction Materials

The table "Construction Materials" gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good*, *fair*, or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In the table "Construction Materials," the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel, or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the

water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have one or more of the following characteristics: a plasticity index of more than 10, a high shrink-swell potential, many stones, slopes of more than 25 percent, or a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In the table "Construction Materials," only the probability of finding material in suitable quantity in or below the soil is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is as much as 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of

less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils generally is preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

The table "Water Management" gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features generally are favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In the table "Water Management," the

soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even more than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of

the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff.

Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Building Site Development

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
2: Riverwash-----						
2B: Marcott-----	Severe: wetness	Moderate: wetness	Severe: wetness	Moderate: wetness	Severe: low strength, frost action	Moderate: excess salt, droughty
Big sandy-----	Severe: cutbanks cave, wetness	Severe: flooding, wetness	Severe: flooding, wetness	Severe: flooding, wetness	Severe: flooding, frost action	Severe: excess salt, droughty
12C: Beaverton-----	Severe: cutbanks cave	Moderate: large stones	Moderate: large stones	Moderate: slope, large stones	Moderate: frost action, large stones	Severe: large stones, droughty
Beaverton-----	Severe: cutbanks cave	Moderate: large stones	Moderate: large stones	Moderate: slope, large stones	Moderate: frost action, large stones	Moderate: small stones, large stones, droughty
13C: Tanna-----	Moderate: depth to rock, too clayey	Slight	Moderate: depth to rock	Moderate: slope	Severe: low strength	Moderate: depth to rock
15E: Lambeth-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope
15F: Lambeth-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope
16B: Degrand-----	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Slight
17B: Delpoint-----	Moderate: depth to rock	Slight	Moderate: depth to rock	Slight	Moderate: low strength, frost action	Moderate: depth to rock
21E: Cabbart-----	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
Delpoint-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
22F: Hillon-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope

Building Site Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
27B: Attewan-----	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Slight
28: Nishon-----	Severe: ponding	Severe: flooding, ponding	Severe: flooding, ponding	Severe: flooding, ponding	Severe: low strength, ponding	Severe: ponding
30B: Marvan-----	Severe: cutbanks cave	Slight	Slight	Slight	Severe: low strength	Severe: too clayey
30C: Marvan-----	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Severe: low strength	Severe: too clayey
31A: Ferd-----	Slight	Slight	Slight	Slight	Severe: low strength	Slight
32B: Kobase-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Slight
32C: Kobase-----	Moderate: too clayey	Slight	Slight	Moderate: slope	Severe: low strength	Slight
32D: Kobase-----	Moderate: too clayey, slope	Moderate: slope	Moderate: slope	Severe: slope	Severe: low strength	Moderate: slope
33A: Phillips-----	Moderate: dense layer	Slight	Slight	Slight	Severe: low strength	Slight
34A: Linnet-----	Severe: cutbanks cave	Slight	Slight	Slight	Severe: low strength	Severe: too clayey
35B: Assinniboine---	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Slight
36B: Chinook-----	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Slight
36C: Chinook-----	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
37B: Evanston-----	Slight	Slight	Slight	Slight	Moderate: low strength, frost action	Slight

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

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Building Site Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
57E: (cont.)						
Reeder-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
58B:						
Lonna-----	Slight	Slight	Slight	Slight	Severe: low strength	Slight
58C:						
Lonna-----	Slight	Slight	Slight	Moderate: slope	Severe: low strength	Slight
60A:						
Havre-----	Slight	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding, frost action	Slight
63:						
Lardell-----	Severe: wetness	Severe: flooding, wetness	Severe: flooding, wetness	Severe: flooding, wetness	Severe: low strength, frost action	Severe: excess salt, too clayey
67B:						
Bearpaw-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Slight
67C:						
Bearpaw-----	Moderate: too clayey	Slight	Slight	Moderate: slope	Severe: low strength	Slight
68B:						
Gerber-----	Severe: cutbanks cave	Slight	Slight	Slight	Severe: low strength	Severe: too clayey
69C:						
Vida-----	Slight	Slight	Slight	Moderate: slope	Moderate: low strength, frost action	Moderate: large stones
Zahill-----	Slight	Slight	Slight	Moderate: slope	Moderate: low strength, frost action	Moderate: large stones
71D:						
Roy-----	Severe: large stones	Severe: large stones	Severe: large stones	Severe: slope, large stones	Severe: large stones	Severe: small stones, large stones
72F:						
Zahill-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
73B:						
Yetull-----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Moderate: droughty
Lonesome-----	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Moderate: droughty

Building Site Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
74C: Shambo-----	Slight	Slight	Slight	Moderate: slope	Moderate: low strength, frost action	Slight
75B: Farnuf-----	Slight	Slight	Slight	Slight	Moderate: frost action	Slight
75C: Farnuf-----	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
76C: Hedoes-----	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Moderate: large stones
77F: Tinsley-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: droughty, slope
79B: Yamacall-----	Slight	Slight	Slight	Slight	Moderate: frost action	Slight
79C: Yamacall-----	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
79D: Yamacall-----	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope, frost action	Moderate: slope
81A: Glendive-----	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding, frost action	Slight
82B: Savage-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Slight
86B: Work-----	Moderate: too clayey	Slight	Slight	Slight	Moderate: low strength, frost action	Slight
86C: Work-----	Moderate: too clayey	Slight	Slight	Moderate: slope	Moderate: low strength, frost action	Slight
86D: Work-----	Moderate: too clayey, slope	Moderate: slope	Moderate: slope	Severe: slope	Moderate: low strength, slope, frost action	Moderate: slope

Building Site Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
87B: Tamaneen-----	Slight	Slight	Slight	Slight	Moderate: frost action	Slight
88C: Perma-----	Severe: cutbanks cave	Moderate: large stones	Moderate: large stones	Moderate: slope, large stones	Moderate: frost action, large stones	Moderate: small stones, large stones, droughty
90A: Harlake-----	Moderate: too clayey	Severe: flooding	Severe: flooding	Severe: flooding	Severe: low strength	Severe: too clayey
92E: Sunburst-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope
Bascovy-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope, too clayey
93F: Yetull-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
94B: Busby-----	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Slight
94C: Busby-----	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
94D: Busby-----	Severe: cutbanks cave	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope, frost action	Moderate: slope
96B: Macar-----	Slight	Slight	Slight	Slight	Moderate: low strength, frost action	Slight
96C: Macar-----	Slight	Slight	Slight	Moderate: slope	Moderate: low strength, frost action	Slight
98B: Kremlin-----	Slight	Slight	Slight	Slight	Moderate: frost action	Slight
98C: Kremlin-----	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Slight

Building Site Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
99:						
Rivra-----	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: droughty
Manly-----	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: droughty, flooding
110C:						
Laceycreek-----	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
110D:						
Laceycreek-----	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope, frost action	Moderate: slope
110E:						
Laceycreek-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
130A:						
Nesda-----	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: droughty, flooding
Nesda-----	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: small stones, droughty
McIlwaine-----	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: droughty, flooding
140A:						
Klayent-----	Severe: wetness	Severe: flooding, wetness	Severe: flooding, wetness	Severe: flooding, wetness	Severe: low strength, frost action	Moderate: wetness
141B:						
Megonot-----	Moderate: depth to rock, too clayey	Slight	Moderate: depth to rock	Slight	Severe: low strength	Moderate: depth to rock
Weingart-----	Moderate: depth to rock, too clayey	Slight	Moderate: depth to rock	Slight	Severe: low strength	Severe: excess sodium
Delpoint-----	Moderate: depth to rock	Slight	Moderate: depth to rock	Slight	Moderate: low strength, frost action	Moderate: depth to rock
142C:						
Megonot-----	Moderate: depth to rock, too clayey	Slight	Moderate: depth to rock	Moderate: slope	Severe: low strength	Moderate: depth to rock
Kobase-----	Moderate: too clayey	Slight	Slight	Moderate: slope	Severe: low strength	Slight

Building Site Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
142C: (cont.)						
Delpoint-----	Moderate: depth to rock	Slight	Moderate: depth to rock	Moderate: slope	Moderate: low strength, frost action	Moderate: depth to rock
160A:						
Bigsandy-----	Severe: cutbanks cave, wetness	Severe: flooding, wetness	Severe: flooding, wetness	Severe: flooding, wetness	Severe: flooding, frost action	Moderate: wetness, flooding
171C:						
Delpoint-----	Moderate: depth to rock	Slight	Moderate: depth to rock	Moderate: slope	Moderate: low strength, frost action	Moderate: depth to rock
Cahbart-----	Severe: depth to rock	Moderate: depth to rock	Severe: depth to rock	Moderate: slope, depth to rock	Moderate: depth to rock, low strength, frost action	Severe: depth to rock
180A:						
McIlwaine-----	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding, frost action	Moderate: droughty
Nesda-----	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding	Moderate: small stones, droughty
Straw-----	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: low strength, flooding, frost action	Slight
182F:						
Megonot-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope
Yawdim-----	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: low strength, slope	Severe: slope, depth to rock
200:						
Badland-----						
201F:						
Cabba-----	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
Wayden-----	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: low strength, slope	Severe: slope, depth to rock
Rock outcrop----						
210C:						
Shane-----	Moderate: depth to rock, too clayey	Slight	Moderate: depth to rock	Moderate: slope	Severe: low strength	Moderate: depth to rock

Building Site Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
210C: (cont.)						
Gerber-----	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Severe: low strength	Severe: too clayey
210E:						
Shane-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope
Barkof-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope, too clayey
Gerber-----	Severe: cutbanks cave	Moderate: slope	Moderate: slope	Severe: slope	Severe: low strength	Severe: too clayey
211F:						
Cabbart-----	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
Yawdim-----	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: low strength, slope	Severe: slope, depth to rock
Rock outcrop----						
212F:						
Cabbart-----	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
Hillon-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope
221E:						
Hillon-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope
Kevin-----	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Severe: low strength	Moderate: slope
222D:						
Hillon-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope
Delpoint-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
223E:						
Hillon-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope
Fleak-----	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock

Building Site Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
224E:						
Hillon-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope
Joplin-----	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope, frost action	Moderate: slope
227F:						
Hillon-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope
Fleak-----	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
Rock outcrop---						
229E:						
Hillon-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope
Lambeth-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope
232A:						
Acel-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Slight
251C:						
Bascovy-----	Severe: cutbanks cave	Slight	Moderate: depth to rock	Moderate: slope	Severe: low strength	Severe: too clayey
Neldore-----	Severe: depth to rock	Moderate: depth to rock	Severe: depth to rock	Moderate: slope, depth to rock	Severe: low strength	Severe: depth to rock, too clayey
251E:						
Bascovy-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope, too clayey
Neldore-----	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: low strength, slope	Severe: slope, depth to rock, too clayey
252C:						
Bascovy-----	Severe: cutbanks cave	Slight	Moderate: depth to rock	Moderate: slope	Severe: low strength	Severe: too clayey
Marvan-----	Severe: cutbanks cave	Slight	Slight	Slight	Severe: low strength	Severe: too clayey

Building Site Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
261B:						
Absher-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Severe: excess sodium, too clayey
Nobe-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Severe: too clayey
263A:						
Toston-----	Moderate: wetness	Severe: flooding	Severe: flooding	Severe: flooding	Severe: frost action	Severe: excess sodium
264A:						
Toston-----	Moderate: wetness	Severe: flooding	Severe: flooding	Severe: flooding	Severe: frost action	Severe: excess sodium
Nobe-----	Moderate: too clayey, wetness	Severe: flooding	Severe: flooding	Severe: flooding	Severe: low strength	Severe: too clayey
265B:						
Absher-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Severe: excess sodium, too clayey
Gerdrum-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Severe: excess sodium
272C:						
Attewan-----	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Slight
Tinsley-----	Severe: cutbanks cave	Moderate: large stones	Moderate: large stones	Moderate: slope, large stones	Moderate: large stones	Severe: droughty
301A:						
Marvan-----	Severe: cutbanks cave	Slight	Slight	Slight	Severe: low strength	Severe: too clayey
Vanda-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Severe: too clayey
301C:						
Marvan-----	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Severe: low strength	Severe: too clayey
Vanda-----	Moderate: too clayey	Slight	Slight	Moderate: slope	Severe: low strength	Severe: too clayey
303A:						
Flatcreek-----	Moderate: too clayey, wetness, flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: low strength, flooding	Severe: too clayey
Nobe-----	Moderate: too clayey, wetness, flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: low strength, flooding	Severe: too clayey

Building Site Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
305A:						
Marvan-----	Severe: cutbanks cave	Slight	Slight	Slight	Severe: low strength	Severe: too clayey
Nobe-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Severe: too clayey
311B:						
Ferd-----	Slight	Slight	Slight	Slight	Severe: low strength	Slight
Creed-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Severe: excess sodium
Gerdum-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Severe: excess sodium
311C:						
Ferd-----	Slight	Slight	Slight	Moderate: slope	Severe: low strength	Slight
Creed-----	Moderate: too clayey	Slight	Slight	Moderate: slope	Severe: low strength	Severe: excess sodium
Gerdum-----	Moderate: too clayey	Slight	Slight	Moderate: slope	Severe: low strength	Severe: excess sodium
323B:						
Sagedale-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Slight
323C:						
Sagedale-----	Moderate: too clayey	Slight	Slight	Moderate: slope	Severe: low strength	Slight
324B:						
Marcott-----	Severe: wetness	Moderate: wetness	Severe: wetness	Moderate: wetness	Severe: low strength, frost action	Slight
331B:						
Phillips-----	Moderate: dense layer	Slight	Slight	Slight	Severe: low strength	Slight
Elloam-----	Moderate: dense layer	Slight	Slight	Slight	Severe: low strength	Severe: excess sodium
331C:						
Phillips-----	Moderate: dense layer	Slight	Slight	Moderate: slope	Severe: low strength	Slight
Elloam-----	Moderate: dense layer	Slight	Slight	Moderate: slope	Severe: low strength	Severe: excess sodium
334B:						
Phillips-----	Moderate: dense layer	Slight	Slight	Slight	Severe: low strength	Slight
Kevin-----	Slight	Slight	Slight	Slight	Severe: low strength	Slight

Building Site Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
341B:						
Linnat-----	Severe: cutbanks cave	Slight	Slight	Slight	Severe: low strength	Severe: too clayey
Marias-----	Severe: cutbanks cave	Slight	Slight	Slight	Severe: low strength	Severe: too clayey
351B:						
Kenilworth-----	Slight	Slight	Slight	Slight	Severe: low strength	Slight
Fortbenton-----	Slight	Slight	Slight	Slight	Severe: low strength	Slight
361B:						
Fortbenton-----	Slight	Slight	Slight	Slight	Severe: low strength	Slight
362C:						
Chinook-----	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
Yetull-----	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Slight	Moderate: droughty
363B:						
Cozberg-----	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Slight
Chinook-----	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Slight
363C:						
Chinook-----	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
Liheh-----	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Slight	Moderate: droughty
364B:						
Chinook-----	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Slight
364C:						
Chinook-----	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
365B:						
Fortbenton-----	Slight	Slight	Slight	Slight	Severe: low strength	Slight
Chinook-----	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Slight
368C:						
Fortbenton-----	Slight	Slight	Slight	Moderate: slope	Severe: low strength	Slight
Hillon-----	Slight	Slight	Slight	Moderate: slope	Severe: low strength	Slight

Building Site Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
372C:						
Evanston-----	Slight	Slight	Slight	Moderate: slope	Moderate: low strength, frost action	Slight
Yamacall-----	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
375B:						
Evanston-----	Slight	Slight	Slight	Slight	Moderate: low strength, frost action	Slight
Lonna-----	Slight	Slight	Slight	Slight	Severe: low strength	Slight
377B:						
Evanston-----	Slight	Slight	Slight	Slight	Moderate: low strength, frost action	Slight
Degrad-----	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Slight
381B:						
Ethridge-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Slight
385B:						
Ethridge-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Slight
Kobase-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Slight
386B:						
Ethridge-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Slight
Evanston-----	Slight	Slight	Slight	Slight	Moderate: low strength, frost action	Slight
388A:						
Ethridge-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Slight
Lonna-----	Slight	Slight	Slight	Slight	Severe: low strength	Slight
402A:						
Gerdum-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Severe: excess sodium
Absher-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Severe: excess sodium, too clayey
Creed-----	Slight	Slight	Slight	Slight	Severe: low strength	Severe: excess sodium

Building Site Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
410: Rock outcrop----						
Fleak-----	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
411D: Farnuf-----	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
Reeder-----	Moderate: depth to rock, slope	Moderate: slope	Moderate: depth to rock, slope	Severe: slope	Moderate: slope, frost action	Moderate: slope, depth to rock
411E: Reeder-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Farnuf-----	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope, frost action	Moderate: slope
421C: Joplin-----	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
Hillon-----	Slight	Slight	Slight	Moderate: slope	Severe: low strength	Slight
422C: Marmarth-----	Moderate: depth to rock	Slight	Moderate: depth to rock	Moderate: slope	Moderate: low strength, frost action	Moderate: depth to rock
441C: Kevin-----	Slight	Slight	Slight	Moderate: slope	Severe: low strength	Slight
Hillon-----	Slight	Slight	Slight	Moderate: slope	Severe: low strength	Slight
442C: Kevin-----	Slight	Slight	Slight	Moderate: slope	Severe: low strength	Slight
Elloam-----	Moderate: dense layer	Slight	Slight	Moderate: slope	Severe: low strength	Severe: excess sodium
444D: Kevin-----	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Severe: low strength	Moderate: slope
Scobey-----	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Severe: low strength	Moderate: slope
451C: Turner-----	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Moderate: large stones

Building Site Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
451C: (cont.)						
Beaverton-----	Severe: cutbanks cave	Moderate: large stones	Moderate: large stones	Moderate: slope, large stones	Moderate: frost action, large stones	Severe: large stones, droughty
Beaverton-----	Severe: cutbanks cave	Moderate: large stones	Moderate: large stones	Moderate: slope, large stones	Moderate: frost action, large stones	Moderate: small stones, large stones, droughty
460:						
Laceycreek-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
471B:						
Marias-----	Severe: cutbanks cave	Slight	Slight	Slight	Severe: low strength	Severe: too clayey
Kobase-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Slight
481A:						
Bigsag-----	Severe: wetness	Severe: flooding, wetness	Severe: flooding, wetness	Severe: flooding, wetness	Severe: low strength	Severe: excess salt, excess sodium, too clayey
493A:						
Enbar-----	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding, frost action	Moderate: flooding
Straw-----	Slight	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: low strength, flooding, frost action	Slight
Eagleton-----	Severe: wetness	Severe: flooding, wetness	Severe: flooding, wetness	Severe: flooding, wetness	Severe: flooding, frost action	Moderate: wetness, flooding
503B:						
Telstad-----	Slight	Slight	Slight	Slight	Moderate: low strength	Slight
Joplin-----	Slight	Slight	Slight	Slight	Moderate: frost action	Slight
503C:						
Telstad-----	Slight	Slight	Slight	Moderate: slope	Moderate: low strength	Slight
Joplin-----	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
510:						
Rock outcrop----						
Belain-----	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope

Building Site Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
511A: Martinsdale-----	Slight	Slight	Slight	Slight	Moderate: frost action	Slight
Turner-----	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Moderate: large stones
511C: Martinsdale-----	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
512C: Martinsdale-----	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope, frost action	Moderate: large stones, slope
521B: Thoeny-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Severe: excess sodium
Elloam-----	Moderate: dense layer	Slight	Slight	Slight	Severe: low strength	Severe: excess sodium
Absher-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Severe: excess sodium, too clayey
530F: Warwood-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
531A: Sweetgrass-----	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Moderate: large stones, droughty
Beaverton-----	Severe: cutbanks cave	Moderate: large stones	Moderate: large stones	Moderate: large stones	Moderate: frost action, large stones	Severe: large stones, droughty
531C: Sweetgrass-----	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Moderate: large stones, droughty
Beaverton-----	Severe: cutbanks cave	Moderate: large stones	Moderate: large stones	Moderate: slope, large stones	Moderate: frost action, large stones	Severe: large stones, droughty
Beaverton-----	Severe: cutbanks cave	Moderate: large stones	Moderate: large stones	Moderate: slope, large stones	Moderate: frost action, large stones	Moderate: small stones, large stones, droughty
550F: Libeg-----	Severe: large stones, slope	Severe: slope, large stones	Severe: slope, large stones	Severe: slope, large stones	Severe: slope, large stones	Severe: slope

Building Site Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
550F: (cont.)						
Arrowpeak-----	Severe: depth to rock, large stones, slope	Severe: slope, depth to rock, large stones	Severe: depth to rock, slope, large stones	Severe: slope, depth to rock, large stones	Severe: depth to rock, slope, large stones	Severe: small stones, large stones, slope
Elkner-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
551B: Lonesome-----	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Moderate: droughty
560F: Elve-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: small stones, droughty, slope
Rock outcrop----						
561B: Scobey-----	Slight	Slight	Slight	Slight	Severe: low strength	Slight
Kevin-----	Slight	Slight	Slight	Slight	Severe: low strength	Slight
561C: Scobey-----	Slight	Slight	Slight	Moderate: slope	Severe: low strength	Slight
Kevin-----	Slight	Slight	Slight	Moderate: slope	Severe: low strength	Slight
562B: Scobey-----	Slight	Slight	Slight	Slight	Severe: low strength	Slight
Linnet-----	Severe: cutbanks cave	Slight	Slight	Slight	Severe: low strength	Severe: too clayey
563A: Fortbenton-----	Slight	Slight	Slight	Slight	Severe: low strength	Slight
Scobey-----	Slight	Slight	Slight	Slight	Severe: low strength	Slight
580F: Garlet-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Elkner-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope

Building Site Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
601A:						
Havre-----	Slight	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding, frost action	Slight
Glendive-----	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding, frost action	Slight
602A:						
Havre-----	Slight	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding, frost action	Slight
603A:						
Havre-----	Moderate: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding
Glendive-----	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding
605C:						
Yamaville-----	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
Havre-----	Moderate: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding
621E:						
Sagedale-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope
Wayden-----	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: low strength, slope	Severe: slope, depth to rock
621F:						
Wayden-----	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: low strength, slope	Severe: slope, depth to rock
Sagedale-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope
623F:						
Linwell-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope
Winifred-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope
630E:						
Crow-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope

Building Site Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
630E: (cont.)						
Lubrecht-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope
641F:						
Norbert-----	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: low strength, slope	Severe: slope, depth to rock, too clayey
Barkof-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope, too clayey
650D:						
Laceycreek-----	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope, frost action	Moderate: slope
Ambrant-----	Severe: cutbanks cave	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope, frost action	Moderate: droughty, slope
650F:						
Laceycreek-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Eaglecreek-----	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope
653F:						
Fleak-----	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
Twilight-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Yetull-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
654F:						
Fleak-----	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
Twilight-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Rock outcrop----						
661E:						
Twilight-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Fleak-----	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock

Building Site Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
671B:						
Bearpaw-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Slight
Vida-----	Slight	Slight	Slight	Slight	Moderate: low strength, frost action	Moderate: large stones
671C:						
Bearpaw-----	Moderate: too clayey	Slight	Slight	Moderate: slope	Severe: low strength	Slight
Vida-----	Slight	Slight	Slight	Moderate: slope	Moderate: low strength, frost action	Moderate: large stones
673A:						
Bearpaw-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Slight
Daglum-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Severe: excess sodium
674B:						
Bearpaw-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Slight
Waltham-----	Slight	Slight	Slight	Slight	Severe: low strength	Severe: excess sodium
680F:						
Winkler-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Ambrant-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Winkler-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
681C:						
Gerber-----	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Severe: low strength	Severe: too clayey
691D:						
Vida-----	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Severe: low strength	Moderate: large stones, slope
Williams-----	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope, frost action	Moderate: slope
692D:						
Vida-----	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Moderate: low strength, slope, frost action	Moderate: large stones, slope

Building Site Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
723F: (cont.)						
Cabba-----	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
731F:						
Yetull-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Dune land-----						
741B:						
Shambo-----	Slight	Slight	Slight	Slight	Moderate: low strength, frost action	Slight
Straw-----	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding
745F:						
Shambo-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Amor-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope
Cabba-----	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
761C:						
Hedoes-----	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Moderate: large stones
Belain-----	Severe: depth to rock	Moderate: depth to rock	Severe: depth to rock	Moderate: slope, depth to rock	Moderate: depth to rock, frost action	Moderate: depth to rock
761E:						
Hedoes-----	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope, frost action	Moderate: large stones, slope
Belain-----	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope
793B:						
Yamacall-----	Slight	Slight	Slight	Slight	Moderate: frost action	Slight
793C:						
Yamacall-----	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
795C:						
Yamacall-----	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Slight

Building Site Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
795C: (cont.)						
Benz-----	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Moderate: excess salt, droughty
795D:						
Yamacall-----	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope, frost action	Moderate: slope
Benz-----	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope, frost action	Moderate: excess salt, droughty, slope
801B:						
Williams-----	Slight	Slight	Slight	Slight	Moderate: frost action	Slight
Vida-----	Slight	Slight	Slight	Slight	Severe: low strength	Moderate: large stones
801C:						
Williams-----	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
Vida-----	Slight	Slight	Slight	Moderate: slope	Severe: low strength	Moderate: large stones
828A:						
Savage-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Slight
842A:						
Savage-----	Moderate: too clayey, wetness	Slight	Moderate: wetness	Slight	Severe: low strength	Slight
Daglum-----	Moderate: too clayey, wetness	Slight	Moderate: wetness	Slight	Severe: low strength	Severe: excess sodium
863E:						
Work-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Roy-----	Severe: large stones, slope	Severe: slope, large stones	Severe: slope, large stones	Severe: slope, large stones	Severe: slope, large stones	Severe: slope
871B:						
Tamaneen-----	Slight	Slight	Slight	Slight	Moderate: frost action	Severe: large stones
871C:						
Tamaneen-----	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Severe: large stones

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

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Building Site Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
916C:						
Belain-----	Severe: depth to rock	Moderate: depth to rock	Severe: depth to rock	Moderate: slope, depth to rock	Moderate: depth to rock, frost action	Moderate: depth to rock
Hedoes-----	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Moderate: large stones
925F:						
Sunburst-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope
Lambeth-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope
941D:						
Busby-----	Severe: cutbanks cave	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope, frost action	Moderate: slope
Twilight-----	Moderate: depth to rock, slope	Moderate: slope	Moderate: depth to rock, slope	Severe: slope	Moderate: slope, frost action	Moderate: slope, depth to rock
943C:						
Tally-----	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
943E:						
Tally-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Vebar-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
943F:						
Tally-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Cohagen-----	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
965F:						
Cabba-----	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
Macar-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
971F:						
Neldore-----	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: low strength, slope	Severe: slope, depth to rock, too clayey

Building Site Development--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
971F: (cont.)						
Bascovy-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope, too clayey
972F:						
Neldore-----	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: low strength, slope	Severe: slope, depth to rock, too clayey
Rock outcrop----						
974F:						
Neldore-----	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: low strength, slope	Severe: slope, depth to rock, too clayey
Hillon-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope

Sanitary Facilities

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
2:					
Riverwash-----					
2B:					
Marcott-----	Severe: wetness, percs slowly	Moderate: slope	Severe: wetness, too clayey	Severe: wetness	Poor: too clayey, hard to pack
Bigsandy-----	Severe: flooding, wetness, percs slowly	Severe: flooding	Severe: flooding, wetness, too clayey	Severe: flooding, wetness	Poor: too clayey, too sandy, wetness
12C:					
Beaverton-----	Severe: poor filter	Severe: seepage, large stones	Severe: seepage, too sandy, large stones	Severe: seepage	Poor: seepage, too sandy, small stones
Beaverton-----	Severe: poor filter	Severe: seepage	Severe: seepage, too sandy	Severe: seepage	Poor: seepage, too sandy, small stones
13C:					
Tanna-----	Severe: depth to rock, percs slowly	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
15E:					
Lambeth-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
15F:					
Lambeth-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
16B:					
Degrad-----	Severe: poor filter	Severe: seepage	Severe: too sandy	Slight	Poor: seepage, too sandy
17B:					
Delpoint-----	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
21E:					
Cabbart-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
Delpoint-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
22F:					
Hillon-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope

Sanitary Facilities--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
27B: Attewan-----	Severe: poor filter	Severe: seepage	Severe: too sandy	Slight	Poor: seepage, too sandy, small stones
28: Nishon-----	Severe: ponding, percs slowly	Severe: ponding	Severe: ponding, too clayey	Severe: ponding	Poor: too clayey, hard to pack, ponding
30B: Marvan-----	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: too clayey, hard to pack
30C: Marvan-----	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: too clayey, hard to pack
31A: Ferd-----	Severe: percs slowly	Slight	Slight	Slight	Good
32B: Kobase-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
32C: Kobase-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
32D: Kobase-----	Severe: percs slowly	Severe: slope	Moderate: slope	Moderate: slope	Fair: slope
33A: Phillips-----	Severe: percs slowly	Slight	Slight	Slight	Good
34A: Linnet-----	Severe: percs slowly	Slight	Severe: too clayey	Slight	Poor: too clayey, hard to pack
35B: Assinniboine---	Moderate: percs slowly	Severe: seepage	Slight	Slight	Fair: thin layer
36B: Chinook-----	Slight	Severe: seepage	Moderate: too sandy	Slight	Fair: too sandy
36C: Chinook-----	Slight	Severe: seepage	Moderate: too sandy	Slight	Fair: too sandy

Sanitary Facilities--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
37B: Evanston-----	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Good
37C: Evanston-----	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Good
38B: Ethridge-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
39B: Assinniboine----	Slight	Severe: seepage	Slight	Slight	Fair: thin layer
43A: Pendroy-----	Severe: percs slowly	Slight	Severe: too clayey	Slight	Poor: too clayey, hard to pack
44B: Kevin-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
47B: Marias-----	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: too clayey, hard to pack
47C: Marias-----	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: too clayey, hard to pack
48A: Vanda-----	Severe: percs slowly	Slight	Slight	Slight	Poor: hard to pack
48C: Vanda-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Poor: hard to pack
50A: Telstad-----	Severe: percs slowly	Slight	Slight	Slight	Good
55B: Lihen-----	Severe: poor filter	Severe: seepage	Severe: seepage, too sandy	Severe: seepage	Poor: too sandy
56A: Scobey-----	Severe: percs slowly	Slight	Slight	Slight	Fair: small stones

Sanitary Facilities--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
57B: Absarokee-----	Severe: depth to rock, percs slowly	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Poor: depth to rock, small stones
57C: Absarokee-----	Severe: depth to rock, percs slowly	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Poor: depth to rock, small stones
57E: Absarokee-----	Severe: depth to rock, percs slowly, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, small stones, slope
Reeder-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, slope
58B: Lonna-----	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Good
58C: Lonna-----	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Good
60A: Havre-----	Moderate: flooding, percs slowly	Moderate: seepage	Moderate: flooding	Moderate: flooding	Good
63: Lardell-----	Severe: wetness, percs slowly	Slight	Severe: wetness, too clayey	Severe: wetness	Poor: too clayey, wetness
67B: Bearpaw-----	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: too clayey, hard to pack
67C: Bearpaw-----	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: too clayey, hard to pack
68B: Gerber-----	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: too clayey, hard to pack
69C: Vida-----	Severe: percs slowly	Moderate: slope	Moderate: too clayey	Slight	Fair: too clayey

Sanitary Facilities--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
69C: (cont.)					
Zahill-----	Severe: percs slowly	Moderate: slope	Moderate: too clayey	Slight	Fair: too clayey
71D:					
Roy-----	Severe: percs slowly, large stones	Severe: slope, large stones	Severe: large stones	Moderate: slope	Poor: small stones
72F:					
Zahill-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
73B:					
Yetull-----	Severe: poor filter	Severe: seepage	Severe: too sandy	Slight	Poor: seepage, too sandy
Lonesome-----	Severe: percs slowly, poor filter	Severe: seepage	Slight	Slight	Good
74C:					
Shambo-----	Moderate: percs slowly	Moderate: seepage, slope	Moderate: too clayey	Slight	Fair: too clayey
75B:					
Farnuf-----	Moderate: percs slowly	Moderate: seepage, slope	Moderate: too clayey	Slight	Fair: too clayey
75C:					
Farnuf-----	Moderate: percs slowly	Moderate: seepage, slope	Moderate: too clayey	Slight	Fair: too clayey
76C:					
Hedoes-----	Slight	Severe: seepage	Severe: seepage	Severe: seepage	Poor: small stones
77F:					
Tinsley-----	Severe: poor filter, slope	Severe: seepage, slope	Severe: seepage, slope, too sandy	Severe: seepage, slope	Poor: seepage, too sandy, small stones
79B:					
Yamacall-----	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Good
79C:					
Yamacall-----	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Good

Sanitary Facilities--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
79D:					
Yamacall-----	Moderate: percs slowly, slope	Severe: slope	Moderate: slope	Moderate: slope	Fair: slope
81A:					
Glendive-----	Moderate: flooding	Severe: seepage	Moderate: flooding, too sandy	Moderate: flooding	Fair: too sandy
82B:					
Savage-----	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: too clayey
86B:					
Work-----	Severe: percs slowly	Moderate: slope	Moderate: too clayey	Slight	Fair: too clayey
86C:					
Work-----	Severe: percs slowly	Moderate: slope	Moderate: too clayey	Slight	Fair: too clayey
86D:					
Work-----	Severe: percs slowly	Severe: slope	Moderate: slope, too clayey	Moderate: slope	Fair: too clayey, slope
87B:					
Tamaneen-----	Moderate: percs slowly	Severe: seepage	Severe: seepage	Severe: seepage	Poor: seepage, small stones
88C:					
Perma-----	Moderate: percs slowly, large stones	Severe: seepage	Severe: seepage, large stones	Severe: seepage	Poor: small stones
90A:					
Karlake-----	Severe: percs slowly	Slight	Moderate: flooding	Moderate: flooding	Poor: hard to pack
92E:					
Sunburst-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
Bascovy-----	Severe: depth to rock, percs slowly, slope	Severe: depth to rock, slope	Severe: depth to rock, slope, too clayey	Severe: depth to rock, slope	Poor: depth to rock, too clayey, hard to pack
93F:					
Yetull-----	Severe: poor filter, slope	Severe: seepage, slope	Severe: slope, too sandy	Severe: slope	Poor: seepage, too sandy, slope
94B:					
Busby-----	Severe: poor filter	Severe: seepage	Moderate: too sandy	Slight	Fair: too sandy

Sanitary Facilities--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
94C: Busby-----	Severe: poor filter	Severe: seepage	Moderate: too sandy	Slight	Fair: too sandy
94D: Busby-----	Severe: poor filter	Severe: seepage, slope	Moderate: slope, too sandy	Moderate: slope	Fair: too sandy, slope
96B: Macar-----	Moderate: percs slowly	Moderate: seepage, slope	Moderate: too clayey	Slight	Fair: too clayey
96C: Macar-----	Moderate: percs slowly	Moderate: seepage, slope	Moderate: too clayey	Slight	Fair: too clayey
98B: Kremlin-----	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Good
98C: Kremlin-----	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Good
99: Rivra-----	Severe: flooding, poor filter	Severe: seepage, flooding	Severe: flooding, too sandy	Severe: flooding	Poor: seepage, too sandy, small stones
Hanly-----	Severe: flooding, poor filter	Severe: seepage, flooding	Severe: flooding, too sandy	Severe: flooding	Poor: seepage, too sandy
110C: Laceycreek-----	Moderate: percs slowly	Severe: seepage	Severe: seepage	Slight	Fair: too clayey, small stones
110D: Laceycreek-----	Moderate: percs slowly, slope	Severe: seepage, slope	Severe: seepage	Moderate: slope	Fair: too clayey, small stones, slope
110E: Laceycreek-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: slope	Poor: slope
130A: Nesda-----	Severe: flooding, poor filter	Severe: seepage, flooding	Severe: flooding, seepage, too sandy	Severe: flooding, seepage	Poor: seepage, too sandy, small stones

Sanitary Facilities--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
130A: (cont.)					
Nesda-----	Severe: flooding, poor filter	Severe: seepage, flooding	Severe: flooding, seepage, too sandy	Severe: flooding, seepage	Poor: seepage, too sandy, small stones
McIlwaine-----	Severe: flooding, poor filter	Severe: seepage, flooding	Severe: flooding, seepage, too sandy	Severe: flooding, seepage	Poor: seepage, too sandy, small stones
140A:					
Klayent-----	Severe: wetness, percs slowly	Moderate: seepage	Severe: wetness, too clayey	Severe: wetness	Poor: too clayey, wetness
141B:					
Megonot-----	Severe: depth to rock, percs slowly	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
Weingart-----	Severe: depth to rock, percs slowly	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock, hard to pack
Delpoint-----	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
142C:					
Megonot-----	Severe: depth to rock, percs slowly	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
Kobase-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
Delpoint-----	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
160A:					
Bigsandy-----	Severe: flooding, wetness, percs slowly	Severe: flooding	Severe: flooding, wetness, too clayey	Severe: flooding, wetness	Poor: too clayey, too sandy, wetness
171C:					
Delpoint-----	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
Cabbart-----	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
180A:					
McIlwaine-----	Severe: poor filter	Severe: seepage	Severe: seepage, too sandy	Severe: seepage	Poor: seepage, too sandy, small stones

Sanitary Facilities--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
180A: (cont.)					
Nesda-----	Severe: poor filter	Severe: seepage	Severe: seepage, too sandy	Severe: seepage	Poor: seepage, too sandy, small stones
Straw-----	Moderate: flooding, percs slowly	Severe: seepage	Severe: seepage	Moderate: flooding	Fair: too clayey
182F:					
Megonot-----	Severe: depth to rock, percs slowly, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
Yawdim-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, hard to pack, slope
200:					
Badland-----					
201F:					
Cabba-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, slope
Wayden-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope, too clayey	Severe: depth to rock, slope	Poor: depth to rock, too clayey, hard to pack
Rock outcrop----					
210C:					
Shane-----	Severe: depth to rock, percs slowly	Severe: depth to rock	Severe: depth to rock, too clayey	Severe: depth to rock	Poor: depth to rock, too clayey, hard to pack
Gerber-----	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: too clayey, hard to pack
210E:					
Shane-----	Severe: depth to rock, percs slowly, slope	Severe: depth to rock, slope	Severe: depth to rock, slope, too clayey	Severe: depth to rock, slope	Poor: depth to rock, too clayey, hard to pack
Barkof-----	Severe: depth to rock, percs slowly, slope	Severe: depth to rock, slope	Severe: depth to rock, slope, too clayey	Severe: depth to rock, slope	Poor: depth to rock, too clayey, hard to pack
Gerber-----	Severe: percs slowly	Severe: slope	Severe: too clayey	Moderate: slope	Poor: too clayey, hard to pack

Sanitary Facilities--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
211F:					
Cabbart-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
Yawdim-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, hard to pack, slope
Rock outcrop----					
212F:					
Cabbart-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
Hillon-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
221E:					
Hillon-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
Kevin-----	Severe: percs slowly	Severe: slope	Moderate: slope	Moderate: slope	Fair: slope
222D:					
Hillon-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
Delpoint-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
223E:					
Hillon-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
Fleak-----	Severe: depth to rock, slope	Severe: seepage, depth to rock, slope	Severe: depth to rock, slope, too sandy	Severe: slope	Poor: depth to rock, too sandy, slope
224E:					
Hillon-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
Joplin-----	Severe: percs slowly	Severe: slope	Moderate: slope	Moderate: slope	Fair: small stones, slope
227F:					
Hillon-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope

Sanitary Facilities--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
227F: (cont.)					
Fleak-----	Severe: depth to rock, slope	Severe: seepage, depth to rock, slope	Severe: depth to rock, slope, too sandy	Severe: slope	Poor: depth to rock, too sandy, slope
Rock outcrop----					
229E:					
Hillon-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
Lambeth-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
232A:					
Acel-----	Severe: percs slowly	Slight	Severe: too clayey	Slight	Poor: too clayey
251C:					
Bascovy-----	Severe: depth to rock, percs slowly	Severe: depth to rock	Severe: depth to rock, too clayey	Severe: depth to rock	Poor: depth to rock, too clayey, hard to pack
Neldore-----	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock, hard to pack
251E:					
Bascovy-----	Severe: depth to rock, percs slowly, slope	Severe: depth to rock, slope	Severe: depth to rock, slope, too clayey	Severe: depth to rock, slope	Poor: depth to rock, too clayey, hard to pack
Neldore-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, hard to pack, slope
252C:					
Bascovy-----	Severe: depth to rock, percs slowly	Severe: depth to rock	Severe: depth to rock, too clayey	Severe: depth to rock	Poor: depth to rock, too clayey, hard to pack
Marvan-----	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: too clayey, hard to pack
261B:					
Absher-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Poor: hard to pack
Nobe-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Poor: hard to pack

Sanitary Facilities--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
263A:					
Toston-----	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Fair: wetness
264A:					
Toston-----	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Fair: wetness
Nobe-----	Severe: percs slowly	Slight	Severe: wetness	Moderate: flooding, wetness	Poor: hard to pack
265B:					
Absher-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Poor: hard to pack
Gerdrum-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Poor: hard to pack
272C:					
Attewan-----	Severe: poor filter	Severe: seepage	Severe: too sandy	Slight	Poor: seepage, too sandy, small stones
Tinsley-----	Severe: poor filter	Severe: seepage	Severe: seepage, too sandy, large stones	Severe: seepage	Poor: seepage, too sandy, small stones
301A:					
Marvan-----	Severe: percs slowly	Slight	Severe: too clayey	Slight	Poor: too clayey, hard to pack
Vanda-----	Severe: percs slowly	Slight	Slight	Slight	Poor: hard to pack
301C:					
Marvan-----	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: too clayey, hard to pack
Vanda-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Poor: hard to pack
303A:					
Flatcreek-----	Severe: flooding, wetness, percs slowly	Severe: flooding	Severe: flooding, wetness, too clayey	Severe: flooding	Poor: too clayey, hard to pack
Nobe-----	Severe: flooding, percs slowly	Severe: flooding	Severe: flooding, wetness	Severe: flooding	Poor: hard to pack
305A:					
Marvan-----	Severe: percs slowly	Slight	Severe: too clayey	Slight	Poor: too clayey, hard to pack

Sanitary Facilities--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
305A: (cont.)					
Nobe-----	Severe: percs slowly	Slight	Slight	Slight	Poor: hard to pack
311B:					
Ferd-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
Creed-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
Gerdrum-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Poor: hard to pack
311C:					
Ferd-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
Creed-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
Gerdrum-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Poor: hard to pack
323B:					
Sagedale-----	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: too clayey
323C:					
Sagedale-----	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: too clayey
324B:					
Marcott-----	Severe: wetness, percs slowly	Slight	Severe: wetness, too clayey	Severe: wetness	Poor: too clayey, hard to pack
331B:					
Phillips-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
Elloam-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
331C:					
Phillips-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
Elloam-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
334B:					
Phillips-----	Severe: percs slowly	Slight	Slight	Slight	Good
Kevin-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good

Sanitary Facilities--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
341B:					
Linnet-----	Severe: percs slowly	Slight	Severe: too clayey	Slight	Poor: too clayey, hard to pack
Marias-----	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: too clayey, hard to pack
351B:					
Kenilworth-----	Severe: percs slowly	Moderate: seepage	Slight	Slight	Good
Fortbenton-----	Severe: percs slowly	Severe: seepage	Slight	Slight	Good
361B:					
Fortbenton-----	Severe: percs slowly	Severe: seepage	Slight	Slight	Good
362C:					
Chinook-----	Slight	Severe: seepage	Moderate: too sandy	Slight	Fair: too sandy
Yetull-----	Severe: poor filter	Severe: seepage	Severe: too sandy	Slight	Poor: seepage, too sandy
363B:					
Cozberg-----	Severe: poor filter	Severe: seepage	Severe: too sandy	Slight	Poor: seepage, too sandy
Chinook-----	Slight	Severe: seepage	Moderate: too sandy	Slight	Fair: too sandy
363C:					
Chinook-----	Slight	Severe: seepage	Moderate: too sandy	Slight	Fair: too sandy
Lihen-----	Severe: poor filter	Severe: seepage	Severe: seepage, too sandy	Severe: seepage	Poor: too sandy
364B:					
Chinook-----	Slight	Severe: seepage	Moderate: too sandy	Slight	Fair: too sandy
364C:					
Chinook-----	Slight	Severe: seepage	Moderate: too sandy	Slight	Fair: too sandy
365B:					
Fortbenton-----	Severe: percs slowly	Severe: seepage	Slight	Slight	Good
Chinook-----	Slight	Severe: seepage	Moderate: too sandy	Slight	Fair: too sandy

Sanitary Facilities--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
368C:					
Fortbenton-----	Severe: percs slowly	Severe: seepage	Slight	Slight	Good
Hillon-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
372C:					
Evanston-----	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Good
Yamacall-----	Moderate: percs slowly	Severe: seepage	Slight	Slight	Good
375B:					
Evanston-----	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Good
Lonna-----	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Good
377B:					
Evanston-----	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Good
Degrad-----	Severe: poor filter	Severe: seepage	Severe: too sandy	Slight	Poor: seepage, too sandy
381B:					
Ethridge-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
385B:					
Ethridge-----	Severe: percs slowly	Slight	Slight	Slight	Good
Kobase-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
386B:					
Ethridge-----	Severe: percs slowly	Slight	Slight	Slight	Good
Evanston-----	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Good
388A:					
Ethridge-----	Severe: percs slowly	Slight	Slight	Slight	Good
Lonna-----	Moderate: percs slowly	Moderate: seepage	Slight	Slight	Good

Sanitary Facilities--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
402A:					
Gerdum-----	Severe: percs slowly	Slight	Slight	Slight	Poor: hard to pack
Absher-----	Severe: percs slowly	Slight	Slight	Slight	Poor: hard to pack
Creed-----	Severe: percs slowly	Slight	Slight	Slight	Good
410:					
Rock outcrop----					
Fleak-----	Severe: depth to rock, slope	Severe: seepage, depth to rock, slope	Severe: depth to rock, slope, too sandy	Severe: slope	Poor: depth to rock, too sandy, slope
411D:					
Farnuf-----	Moderate: percs slowly	Moderate: seepage, slope	Moderate: too clayey	Slight	Fair: too clayey
Reeder-----	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Severe: depth to rock	Poor: depth to rock
411E:					
Reeder-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, slope
Farnuf-----	Moderate: percs slowly, slope	Severe: slope	Moderate: slope, too clayey	Moderate: slope	Fair: too clayey, slope
421C:					
Joplin-----	Severe: percs slowly	Moderate: seepage, slope	Slight	Slight	Fair: small stones
Hillon-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
422C:					
Marmarth-----	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
441C:					
Kevin-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
Hillon-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
442C:					
Kevin-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
Elloam-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good

Sanitary Facilities--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
444D:					
Kevin-----	Severe: percs slowly	Severe: slope	Moderate: slope	Moderate: slope	Fair: slope
Scobey-----	Severe: percs slowly	Severe: slope	Moderate: slope	Moderate: slope	Fair: small stones, slope
451C:					
Turner-----	Severe: poor filter	Severe: seepage	Severe: seepage, too sandy	Severe: seepage	Poor: seepage, too sandy, small stones
Beaverton-----	Severe: poor filter	Severe: seepage, large stones	Severe: seepage, too sandy, large stones	Severe: seepage	Poor: seepage, too sandy, small stones
Beaverton-----	Severe: poor filter	Severe: seepage	Severe: seepage, too sandy	Severe: seepage	Poor: seepage, too sandy, small stones
460:					
Laceycreek-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: slope	Poor: slope
471B:					
Marias-----	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: too clayey, hard to pack
Kobase-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
481A:					
Bigsag-----	Severe: wetness, percs slowly	Slight	Severe: wetness, too clayey, excess sodium	Severe: wetness	Poor: too clayey, hard to pack, wetness
493A:					
Enbar-----	Severe: flooding, wetness	Severe: seepage, flooding, wetness	Severe: flooding, seepage, wetness	Severe: flooding, wetness	Fair: too clayey, wetness, thin layer
Straw-----	Moderate: flooding, percs slowly	Moderate: seepage	Moderate: flooding, too clayey	Moderate: flooding	Fair: too clayey
Eagleton-----	Severe: flooding, wetness	Severe: flooding, wetness	Severe: flooding, wetness	Severe: flooding, wetness	Poor: wetness
503B:					
Telstad-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good

Sanitary Facilities--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
503B: (cont.)					
Joplin-----	Severe: percs slowly	Moderate: seepage, slope	Slight	Slight	Fair: small stones
503C:					
Telstad-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
Joplin-----	Severe: percs slowly	Moderate: seepage, slope	Slight	Slight	Fair: small stones
510:					
Rock outcrop----					
Belain-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, slope
511A:					
Martinsdale-----	Severe: percs slowly	Slight	Moderate: too clayey	Slight	Fair: too clayey
Turner-----	Severe: poor filter	Severe: seepage	Severe: seepage, too sandy	Severe: seepage	Poor: seepage, too sandy, small stones
511C:					
Martinsdale-----	Severe: percs slowly	Moderate: slope	Moderate: too clayey	Slight	Fair: too clayey
512C:					
Martinsdale-----	Severe: percs slowly	Severe: slope	Moderate: slope, too clayey	Moderate: slope	Fair: too clayey, slope
521B:					
Thoeny-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
Elloam-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
Absher-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Poor: hard to pack
530F:					
Warwood-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
531A:					
Sweetgrass-----	Moderate: percs slowly	Severe: seepage	Severe: seepage, too sandy	Severe: seepage	Poor: seepage, too sandy, small stones

Sanitary Facilities--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
531A: (cont.)					
Beaverton-----	Severe: poor filter	Severe: seepage, large stones	Severe: seepage, too sandy, large stones	Severe: seepage	Poor: seepage, too sandy, small stones
531C:					
Sweetgrass-----	Moderate: percs slowly	Severe: seepage	Severe: seepage, too sandy	Severe: seepage	Poor: seepage, too sandy, small stones
Beaverton-----	Severe: poor filter	Severe: seepage, large stones	Severe: seepage, too sandy, large stones	Severe: seepage	Poor: seepage, too sandy, small stones
Beaverton-----	Severe: poor filter	Severe: seepage	Severe: seepage, too sandy	Severe: seepage	Poor: seepage, too sandy, small stones
550F:					
Libeg-----	Severe: slope, large stones	Severe: slope, large stones	Severe: slope, large stones	Severe: slope	Poor: small stones, slope
Arrowpeak-----	Severe: depth to rock, slope, large stones	Severe: seepage, depth to rock, slope	Severe: depth to rock, seepage, slope	Severe: depth to rock, slope	Poor: depth to rock, small stones, slope
Elkner-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: slope
551B:					
Lonesome-----	Severe: percs slowly, poor filter	Severe: seepage	Slight	Slight	Good
560F:					
Elve-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope, large stones	Severe: seepage, slope	Poor: seepage, small stones, slope
Rock outcrop----					
561B:					
Scobey-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Fair: small stones
Kevin-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good

Sanitary Facilities--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
561C:					
Scobey-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Fair: small stones
Kevin-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
562B:					
Scobey-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Fair: small stones
Linnet-----	Severe: percs slowly	Slight	Severe: too clayey	Slight	Poor: too clayey, hard to pack
563A:					
Fortbenton-----	Severe: percs slowly	Severe: seepage	Slight	Slight	Good
Scobey-----	Severe: percs slowly	Slight	Slight	Slight	Fair: small stones
580F:					
Garlet-----	Severe: slope	Severe: slope	Severe: slope, large stones	Severe: slope	Poor: small stones, slope
Elkner-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: slope
601A:					
Havre-----	Moderate: flooding, percs slowly	Moderate: seepage	Moderate: flooding	Moderate: flooding	Good
Glendive-----	Moderate: flooding	Severe: seepage	Moderate: flooding, too sandy	Moderate: flooding	Fair: too sandy
602A:					
Havre-----	Moderate: flooding, percs slowly	Moderate: seepage	Moderate: flooding	Moderate: flooding	Good
603A:					
Havre-----	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Good
Glendive-----	Severe: flooding	Severe: seepage, flooding	Severe: flooding	Severe: flooding	Fair: too sandy
605C:					
Yamacall-----	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Good
Havre-----	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Good

Sanitary Facilities--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
621E:					
Sagedale-----	Severe: percs slowly, slope	Severe: slope	Severe: slope, too clayey	Severe: slope	Poor: too clayey, slope
Wayden-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope, too clayey	Severe: depth to rock, slope	Poor: depth to rock, too clayey, hard to pack
621F:					
Wayden-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope, too clayey	Severe: depth to rock, slope	Poor: depth to rock, too clayey, hard to pack
Sagedale-----	Severe: percs slowly, slope	Severe: slope	Severe: slope, too clayey	Severe: slope	Poor: too clayey, slope
623F:					
Linwell-----	Severe: percs slowly, slope	Severe: slope	Severe: slope, too clayey	Severe: slope	Poor: too clayey, slope
Winifred-----	Severe: depth to rock, percs slowly, slope	Severe: depth to rock, slope	Severe: depth to rock, slope, too clayey	Severe: depth to rock, slope	Poor: depth to rock, too clayey, hard to pack
630E:					
Crow-----	Severe: percs slowly, slope	Severe: slope	Severe: slope, too clayey	Severe: slope	Poor: too clayey, hard to pack, slope
Lubrecht-----	Severe: depth to rock, percs slowly, slope	Severe: depth to rock, slope	Severe: depth to rock, slope, too clayey	Severe: depth to rock, slope	Poor: depth to rock, too clayey, slope
641F:					
Norbert-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope, too clayey	Severe: depth to rock, slope	Poor: depth to rock, too clayey, hard to pack
Barkof-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope, too clayey	Severe: depth to rock, slope	Poor: depth to rock, too clayey, hard to pack
650D:					
Lacey Creek-----	Moderate: percs slowly, slope	Severe: seepage, slope	Severe: seepage	Moderate: slope	Fair: too clayey, small stones, slope
Ambrant-----	Moderate: slope	Severe: seepage, slope	Severe: seepage	Severe: seepage	Fair: small stones, slope

Sanitary Facilities--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
650F:					
Laceycreek-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: slope	Poor: slope
Eaglecreek-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, slope
653F:					
Fleak-----	Severe: depth to rock, slope	Severe: seepage, depth to rock, slope	Severe: depth to rock, slope, too sandy	Severe: slope	Poor: depth to rock, too sandy, slope
Twilight-----	Severe: depth to rock, slope	Severe: seepage, depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
Yetull-----	Severe: poor filter, slope	Severe: seepage, slope	Severe: slope, too sandy	Severe: slope	Poor: seepage, too sandy, slope
654F:					
Fleak-----	Severe: depth to rock, slope	Severe: seepage, depth to rock, slope	Severe: depth to rock, slope, too sandy	Severe: slope	Poor: depth to rock, too sandy, slope
Twilight-----	Severe: depth to rock, slope	Severe: seepage, depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
Rock outcrop----					
661E:					
Twilight-----	Severe: depth to rock, slope	Severe: seepage, depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
Fleak-----	Severe: depth to rock, slope	Severe: seepage, depth to rock, slope	Severe: depth to rock, slope, too sandy	Severe: slope	Poor: depth to rock, too sandy, slope
671B:					
Bearpaw-----	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: too clayey, hard to pack
Vida-----	Severe: percs slowly	Moderate: slope	Moderate: too clayey	Slight	Fair: too clayey
671C:					
Bearpaw-----	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: too clayey, hard to pack

Sanitary Facilities--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
671C: (cont.)					
Vida-----	Severe: percs slowly	Moderate: slope	Moderate: too clayey	Slight	Fair: too clayey
673A:					
Bearpaw-----	Severe: percs slowly	Slight	Severe: too clayey	Slight	Poor: too clayey, hard to pack
Daglum-----	Severe: percs slowly	Slight	Severe: too clayey, excess sodium	Slight	Poor: too clayey, hard to pack, excess sodium
674B:					
Bearpaw-----	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: too clayey, hard to pack
Waltham-----	Severe: percs slowly	Moderate: slope	Severe: excess sodium	Slight	Poor: excess sodium
680F:					
Winkler-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
Ambrant-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: slope
Winkler-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
681C:					
Gerber-----	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: too clayey, hard to pack
691D:					
Vida-----	Severe: percs slowly	Severe: slope	Moderate: slope, too clayey	Moderate: slope	Fair: too clayey, slope
Williams-----	Severe: percs slowly	Severe: slope	Moderate: slope, too clayey	Moderate: slope	Fair: too clayey, small stones, slope
692D:					
Vida-----	Severe: percs slowly	Severe: slope	Moderate: slope, too clayey	Moderate: slope	Fair: too clayey, slope
Bearpaw-----	Severe: percs slowly	Severe: slope	Severe: too clayey	Moderate: slope	Poor: too clayey, hard to pack

Sanitary Facilities--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
693C:					
Vida-----	Severe: percs slowly	Severe: slope	Moderate: slope, too clayey	Moderate: slope	Fair: too clayey, slope
Bearpaw-----	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: too clayey, hard to pack
Nishon-----	Severe: ponding, percs slowly	Severe: ponding	Severe: ponding, too clayey	Severe: ponding	Poor: too clayey, hard to pack, ponding
701E:					
Work-----	Severe: percs slowly	Severe: slope	Moderate: slope, too clayey	Moderate: slope	Fair: too clayey, slope
Absarokee-----	Severe: depth to rock, percs slowly, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, small stones, slope
702E:					
Work-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
Absarokee-----	Severe: depth to rock, percs slowly, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, small stones, slope
721E:					
Zahill-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
Vida-----	Severe: percs slowly	Severe: slope	Moderate: slope, too clayey	Moderate: slope	Fair: too clayey, slope
722F:					
Zahill-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
Sagedale-----	Severe: percs slowly, slope	Severe: slope	Severe: slope, too clayey	Severe: slope	Poor: too clayey, slope
Wayden-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope, too clayey	Severe: depth to rock, slope	Poor: depth to rock, too clayey, hard to pack

Sanitary Facilities--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
723F:					
Zahill-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
Cabba-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, slope
731F:					
Yetull-----	Severe: poor filter, slope	Severe: seepage, slope	Severe: slope, too sandy	Severe: slope	Poor: seepage, too sandy, slope
Dune land-----					
741B:					
Shambo-----	Moderate: percs slowly	Moderate: seepage, slope	Moderate: too clayey	Slight	Fair: too clayey
Straw-----	Severe: flooding	Severe: seepage, flooding	Severe: flooding, seepage	Severe: flooding	Fair: too clayey
745F:					
Shambo-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
Amor-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, slope
Cabba-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, slope
761C:					
Hedoes-----	Slight	Severe: seepage	Severe: seepage	Severe: seepage	Poor: small stones
Belain-----	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Poor: depth to rock
761E:					
Hedoes-----	Moderate: slope	Severe: seepage, slope	Severe: seepage	Severe: seepage	Poor: small stones
Belain-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, slope
793B:					
Yamacall-----	Moderate: percs slowly	Severe: seepage	Slight	Slight	Good

Sanitary Facilities--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
793C:					
Yamacall-----	Moderate: percs slowly	Severe: seepage	Slight	Slight	Good
795C:					
Yamacall-----	Moderate: percs slowly	Severe: seepage	Slight	Slight	Good
Benz-----	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
795D:					
Yamacall-----	Moderate: percs slowly, slope	Severe: seepage, slope	Moderate: slope	Moderate: slope	Fair: slope
Benz-----	Severe: percs slowly	Severe: slope	Moderate: slope	Moderate: slope	Fair: slope
801B:					
Williams-----	Severe: percs slowly	Moderate: seepage, slope	Moderate: too clayey	Slight	Fair: too clayey, small stones
Vida-----	Severe: percs slowly	Moderate: slope	Moderate: too clayey	Slight	Fair: too clayey
801C:					
Williams-----	Severe: percs slowly	Moderate: seepage, slope	Moderate: too clayey	Slight	Fair: too clayey, small stones
Vida-----	Severe: percs slowly	Moderate: slope	Moderate: too clayey	Slight	Fair: too clayey
828A:					
Savage-----	Severe: percs slowly	Slight	Severe: too clayey	Slight	Poor: too clayey
842A:					
Savage-----	Severe: percs slowly	Slight	Severe: wetness, too clayey	Moderate: wetness	Poor: too clayey
Daglum-----	Severe: percs slowly	Slight	Severe: wetness, too clayey, excess sodium	Moderate: wetness	Poor: too clayey, hard to pack, excess sodium
863E:					
Work-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
Roy-----	Severe: percs slowly, slope, large stones	Severe: slope, large stones	Severe: slope, large stones	Severe: slope	Poor: small stones, slope

Sanitary Facilities--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
871B: Tamaneen-----	Moderate: percs slowly	Severe: seepage	Severe: seepage	Severe: seepage	Poor: seepage, small stones
871C: Tamaneen-----	Moderate: percs slowly	Severe: seepage	Severe: seepage	Severe: seepage	Poor: seepage, small stones
883F: Perma-----	Severe: slope	Severe: seepage, slope, large stones	Severe: seepage, slope, large stones	Severe: seepage, slope	Poor: seepage, small stones, slope
Whitlash-----	Severe: depth to rock, slope, large stones	Severe: depth to rock, slope, large stones	Severe: depth to rock, slope, large stones	Severe: depth to rock, slope	Poor: depth to rock, large stones, slope
892F: Whitlash-----	Severe: depth to rock, slope, large stones	Severe: depth to rock, slope, large stones	Severe: depth to rock, slope, large stones	Severe: depth to rock, slope	Poor: depth to rock, large stones, slope
Belain-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, slope
Rock outcrop----					
895F: Belain-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, slope
Whitlash-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, small stones, slope
Hedoes-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: small stones, slope
896E: Belain-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, slope
Whitlash-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, small stones, slope
Rock outcrop----					

Sanitary Facilities--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
911F:					
Belain-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, slope
Whitlash-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, small stones, slope
Hedoes-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: small stones, slope
916C:					
Belain-----	Severe: depth to rock	Severe: seepage, depth to rock	Severe: depth to rock, seepage	Severe: depth to rock, seepage	Poor: depth to rock
Hedoes-----	Slight	Severe: seepage	Severe: seepage	Severe: seepage	Poor: small stones
925F:					
Sunburst-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
Lambeth-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
941D:					
Busby-----	Severe: poor filter	Severe: seepage, slope	Moderate: slope, too sandy	Moderate: slope	Fair: too sandy, slope
Twilight-----	Severe: depth to rock	Severe: seepage, depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
943C:					
Tally-----	Slight	Severe: seepage	Severe: seepage	Severe: seepage	Fair: too sandy
943E:					
Tally-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: slope
Vebar-----	Severe: depth to rock, slope	Severe: seepage, depth to rock, slope	Severe: depth to rock, seepage, slope	Severe: depth to rock, seepage, slope	Poor: depth to rock, slope
943F:					
Tally-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: slope

Sanitary Facilities--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
943F: (cont.)					
Cohagen-----	Severe: depth to rock, slope	Severe: seepage, depth to rock, slope	Severe: depth to rock, seepage, slope	Severe: depth to rock, slope	Poor: depth to rock, slope
965F:					
Cabba-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, slope
Macar-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
971F:					
Neldore-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, hard to pack, slope
Bascovy-----	Severe: depth to rock, percs slowly, slope	Severe: depth to rock, slope	Severe: depth to rock, slope, too clayey	Severe: depth to rock, slope	Poor: depth to rock, too clayey, hard to pack
972F:					
Neldore-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, hard to pack, slope
Rock outcrop----					
974F:					
Neldore-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, hard to pack, slope
Hillon-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope

Construction Materials

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
2:				
Riverwash-----				
2B:				
Marcott-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt
Bigsandy-----	Fair: low strength, wetness	Improbable: excess fines	Improbable: excess fines	Poor: excess salt
12C:				
Beaverton-----	Fair: large stones	Probable	Probable	Poor: too sandy, small stones, area reclaim
Beaverton-----	Fair: large stones	Probable	Probable	Poor: too sandy, small stones, area reclaim
13C:				
Tanna-----	Poor: depth to rock, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
15E:				
Lambeth-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: slope
15F:				
Lambeth-----	Poor: low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
16B:				
Degrad-----	Good	Probable	Probable	Poor: small stones
17B:				
Delpoint-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
21E:				
Cabbart-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
Delpoint-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope
22F:				
Hillon-----	Poor: low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: slope

Construction Materials--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
27B: Attewan-----	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim
28: Nishon-----	Poor: low strength, wetness	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, wetness
30B: Marvan-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
30C: Marvan-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
31A: Ferd-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: thin layer
32B: Kobase-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
32C: Kobase-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
32D: Kobase-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
33A: Phillips-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: thin layer
34A: Linnet-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
35B: Assinniboine---	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
36B: Chinook-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: small stones
36C: Chinook-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: small stones
37B: Evanston-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, large stones

Construction Materials--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
37C: Evanston-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, large stones
38B: Ethridge-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
39B: Assinniboine----	Good	Improbable: excess fines	Improbable: excess fines	Fair: small stones
43A: Pendroy-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
44B: Kevin-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: thin layer
47B: Marias-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
47C: Marias-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
48A: Vanda-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt
48C: Vanda-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt
50A: Telstad-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
55B: Lihen-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: too sandy
56A: Scobey-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: small stones
57B: Absarokee-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: small stones
57C: Absarokee-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: small stones

Construction Materials--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
57E:				
Absarokee-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: small stones, slope
Reeder-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope
58B:				
Lonna-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, excess salt, thin layer
58C:				
Lonna-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, excess salt, thin layer
60A:				
Havre-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
63:				
Lardell-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt
67B:				
Bearpaw-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
67C:				
Bearpaw-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
68B:				
Gerber-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
69C:				
Vida-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
Zahill-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
71D:				
Roy-----	Poor: large stones	Improbable: excess fines, large stones	Improbable: excess fines, large stones	Poor: small stones, area reclaim
72F:				
Zahill-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
73B:				
Yetull-----	Good	Probable	Improbable: too sandy	Poor: too sandy

Construction Materials--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
73B: (cont.) Lonesome-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too sandy
74C: Shambo-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
75B: Farnuf-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones, area reclaim
75C: Farnuf-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones, area reclaim
76C: Hedoes-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim
77F: Tinsley-----	Poor: slope	Probable	Probable	Poor: too sandy, small stones, area reclaim
79B: Yamacall-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
79C: Yamacall-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
79D: Yamacall-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones, slope
81A: Glendive-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: small stones
82B: Savage-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
86B: Work-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: thin layer
86C: Work-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: thin layer

Construction Materials--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
86D: Work-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: thin layer
87B: Tamaneen-----	Good	Improbable: small stones	Probable	Poor: small stones, area reclaim
88C: Perma-----	Fair: large stones	Improbable: small stones	Probable	Poor: small stones, area reclaim
90A: Harlake-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
92E: Sunburst-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, slope
Bascovy-----	Poor: depth to rock, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, slope
93F: Yetull-----	Poor: slope	Probable	Improbable: too sandy	Poor: too sandy, slope
94B: Busby-----	Good	Improbable: excess fines	Improbable: excess fines	Good
94C: Busby-----	Good	Improbable: excess fines	Improbable: excess fines	Good
94D: Busby-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: slope
96B: Macar-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
96C: Macar-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
98B: Kremlin-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
98C: Kremlin-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones

Construction Materials--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
99:				
Rivra-----	Fair: large stones	Probable	Probable	Poor: too sandy, small stones, area reclaim
Hanly-----	Good	Probable	Improbable: too sandy	Poor: too sandy
110C:				
Laceycreek-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones
110D:				
Laceycreek-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones
110E:				
Laceycreek-----	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, slope
130A:				
Nesda-----	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim
Nesda-----	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim
McIlwaine-----	Good	Probable	Probable	Poor: small stones, area reclaim
140A:				
Klayent-----	Fair: wetness	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
141B:				
Megonot-----	Poor: depth to rock, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Weingart-----	Poor: depth to rock, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt, excess sodium
Delpoint-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
142C:				
Megonot-----	Poor: depth to rock, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey

Construction Materials--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
142C: (cont.)				
Kobase-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Delpoint-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
160A:				
Bigsandy-----	Fair: low strength, wetness	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, excess salt, thin layer
171C:				
Delpoint-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
Cabbart-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
180A:				
McIlwaine-----	Good	Probable	Probable	Poor: small stones, area reclaim
Nesda-----	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim
Straw-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
182F:				
Megonot-----	Poor: depth to rock, low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, small stones, slope
Yawdim-----	Poor: depth to rock, low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey, slope
200:				
Badland-----				
201F:				
Cabba-----	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
Wayden-----	Poor: depth to rock, low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey, slope

Construction Materials--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
201F: (cont.)				
Rock outcrop----				
210C:				
Shane-----	Poor: depth to rock, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Gerber-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
210E:				
Shane-----	Poor: depth to rock, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, slope
Barkof-----	Poor: depth to rock, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, slope
Gerber-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
211F:				
Cabbart-----	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
Yawdim-----	Poor: depth to rock, low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey, slope
Rock outcrop----				
212F:				
Cabbart-----	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
Hillon-----	Poor: low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
221E:				
Hillon-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: slope
Kevin-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: thin layer
222D:				
Hillon-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: slope
Delpoint-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope
223E:				
Hillon-----	Poor: low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: slope

Construction Materials--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
223E: (cont.)				
Fleak-----	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too sandy, slope
224E:				
Hillon-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: slope
Joplin-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones
227F:				
Hillon-----	Poor: low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
Fleak-----	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too sandy, slope
Rock outcrop----				
229E:				
Hillon-----	Poor: low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
Lambeth-----	Poor: low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
232A:				
Acel-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
251C:				
Bascovy-----	Poor: depth to rock, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Neldore-----	Poor: depth to rock, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey
251E:				
Bascovy-----	Poor: depth to rock, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, slope
Neldore-----	Poor: depth to rock, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey, slope
252C:				
Bascovy-----	Poor: depth to rock, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey

Construction Materials--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
252C: (cont.)				
Marvan-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
261B:				
Absher-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt, excess sodium
Nobe-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt
263A:				
Toston-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: excess salt, excess sodium
264A:				
Toston-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: excess salt, excess sodium
Nobe-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt
265B:				
Absher-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt, excess sodium
Gerdrum-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt, excess sodium
272C:				
Attewan-----	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim
Tinsley-----	Fair: large stones	Probable	Probable	Poor: too sandy, small stones, area reclaim
301A:				
Marvan-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Vanda-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt
301C:				
Marvan-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey

Construction Materials--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
301C: (cont.)				
Vanda-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt
303A:				
Flatcreek-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt
Nobe-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt
305A:				
Marvan-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt
Nobe-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt
311B:				
Ferd-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: thin layer
Creed-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess sodium
Gerdrum-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt, excess sodium
311C:				
Ferd-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: thin layer
Creed-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess sodium
Gerdrum-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt, excess sodium
323B:				
Sagedale-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, small stones
323C:				
Sagedale-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, small stones
324B:				
Marcott-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey

Construction Materials--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
331B:				
Phillips-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: thin layer
Elloam-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim, excess salt, excess sodium
331C:				
Phillips-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: thin layer
Elloam-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim, excess salt, excess sodium
334B:				
Phillips-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: thin layer
Kevin-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: thin layer
341B:				
Linnet-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Marias-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
351B:				
Kenilworth-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
Fortbenton-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Good
361B:				
Fortbenton-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Good
362C:				
Chinook-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: small stones
Yetull-----	Good	Probable	Improbable: too sandy	Poor: too sandy
363B:				
Cozberg-----	Good	Probable	Probable	Fair: small stones, area reclaim, thin layer
Chinook-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: small stones

Construction Materials--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
363C:				
Chinook-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: small stones
Lihe-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: too sandy
364B:				
Chinook-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: small stones
364C:				
Chinook-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: small stones
365B:				
Fortbenton-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Good
Chinook-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: small stones
368C:				
Fortbenton-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Good
Millon-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
372C:				
Evanston-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, large stones
Yamacall-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones
375B:				
Evanston-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, large stones
Lonna-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, excess salt, thin layer
377B:				
Evanston-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, large stones
Degrad-----	Good	Probable	Probable	Poor: small stones
381B:				
Ethridge-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey

Construction Materials--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
385B:				
Ethridge-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Kabase-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
386B:				
Ethridge-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Evanston-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, large stones
388A:				
Ethridge-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Lonna-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, excess salt, thin layer
402A:				
Gerdrum-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt, excess sodium
Absher-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt, excess sodium
Creed-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: excess sodium
410:				
Rock outcrop---				
Fleak-----	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too sandy, slope
411D:				
Farnuf-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones, area reclaim
Reeder-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
411E:				
Reeder-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope

Construction Materials--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
411E: (cont.) Farnuf-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones, area reclaim
421C: Joplin-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones
Hillon-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
422C: Marmarth-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, thin layer
441C: Kevin-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: thin layer
Hillon-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
442C: Kevin-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: thin layer
Elloam-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim, excess salt, excess sodium
444D: Kevin-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: thin layer
Scobey-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: small stones
451C: Turner-----	Good	Probable	Probable	Poor: small stones, area reclaim
Beaverton-----	Fair: large stones	Probable	Probable	Poor: too sandy, small stones, area reclaim
Beaverton-----	Fair: large stones	Probable	Probable	Poor: too sandy, small stones, area reclaim
460: Laceycreek-----	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, slope

Construction Materials--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
471B:				
Marias-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Kabase-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
481A:				
Bigsag-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt, excess sodium
493A:				
Enbar-----	Fair: wetness	Probable	Probable	Poor: area reclaim
Straw-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Good
Eagleton-----	Fair: wetness	Improbable: excess fines	Improbable: excess fines	Good
503B:				
Telstad-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
Joplin-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones
503C:				
Telstad-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
Joplin-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones
510:				
Rock outcrop---				
Belain-----	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, slope
511A:				
Martinsdale----	Good	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim
Turner-----	Good	Probable	Probable	Poor: small stones, area reclaim
511C:				
Martinsdale----	Good	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim
512C:				
Martinsdale----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim

Construction Materials--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
521B:				
Thoeny-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess sodium
Elloam-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim, excess salt, excess sodium
Absher-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt, excess sodium
530F:				
Warwood-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, slope
531A:				
Sweetgrass-----	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim
Beaverton-----	Fair: large stones	Probable	Probable	Poor: too sandy, small stones, area reclaim
531C:				
Sweetgrass-----	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim
Beaverton-----	Fair: large stones	Probable	Probable	Poor: too sandy, small stones, area reclaim
Beaverton-----	Fair: large stones	Probable	Probable	Poor: too sandy, small stones, area reclaim
550F:				
Libeg-----	Poor: large stones, slope	Improbable: excess fines, large stones	Improbable: excess fines, large stones	Poor: small stones, area reclaim, slope
Arrowpeak-----	Poor: depth to rock, large stones, slope	Improbable: excess fines, large stones	Improbable: excess fines, large stones	Poor: depth to rock, small stones, slope
Elkner-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, slope

Construction Materials--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
551B: Lonesome-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too sandy
560F: Elve-----	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
Rock outcrop---				
561B: Scobey-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: small stones
Kevin-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: thin layer
561C: Scobey-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: small stones
Kevin-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: thin layer
562B: Scobey-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: small stones
Linnet-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
563A: Fortbenton----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Good
Scobey-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: thin layer
580F: Garlet-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
Elkner-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, slope
601A: Havre-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
Glendive-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: small stones
602A: Havre-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey

Construction Materials--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
603A:				
Havre-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
Glendive-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: small stones
605C:				
Yamacall-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
Havre-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
621E:				
Sagedale-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, small stones, slope
Wayden-----	Poor: depth to rock, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey, slope
621F:				
Wayden-----	Poor: depth to rock, low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey, slope
Sagedale-----	Poor: low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, small stones, slope
623F:				
Linwell-----	Poor: low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, slope
Winifred-----	Poor: depth to rock, low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, slope
630E:				
Crow-----	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, slope
Lubrecht-----	Poor: depth to rock, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, slope
641F:				
Norbert-----	Poor: depth to rock, low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey, slope

Construction Materials--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
641F: (cont.)				
Barkof-----	Poor: depth to rock, low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, slope
650D:				
Laceycreek-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones
Ambrant-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim
650F:				
Laceycreek-----	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, slope
Eaglecreek-----	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, slope
653F:				
Fleak-----	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too sandy, slope
Twilight-----	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
Yetull-----	Poor: slope	Probable	Improbable: too sandy	Poor: too sandy, slope
654F:				
Fleak-----	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too sandy, slope
Twilight-----	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
Rock outcrop----				
661E:				
Twilight-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope
Fleak-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too sandy, slope
671B:				
Bearpaw-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey

Construction Materials--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
671B: (cont.)				
Vida-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
671C:				
Bearpaw-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Vida-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
673A:				
Bearpaw-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Daglum-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt, excess sodium
674B:				
Bearpaw-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Waltham-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: excess salt, excess sodium
680F:				
Winkler-----	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
Ambrant-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
Winkler-----	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
681C:				
Gerber-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
691D:				
Vida-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones, slope
Williams-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones

Construction Materials--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
692D:				
Vida-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones, slope
Bearpaw-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
693C:				
Vida-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones, slope
Bearpaw-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Nishon-----	Poor: low strength, wetness	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, wetness
701E:				
Work-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: thin layer
Absarokee-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: small stones, slope
702E:				
Work-----	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, slope
Absarokee-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: small stones, slope
721E:				
Zahill-----	Fair: low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
Vida-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones, slope
722F:				
Zahill-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
Sagedale-----	Poor: low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, small stones, slope

Construction Materials--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
722F: (cont.)				
Wayden-----	Poor: depth to rock, low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey, slope
723F:				
Zahill-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
Cabba-----	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
731F:				
Yetull-----	Poor: slope	Probable	Improbable: too sandy	Poor: too sandy, slope
Dune land-----				
741B:				
Shambo-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
Straw-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
745F:				
Shambo-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
Amor-----	Poor: depth to rock, low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
Cabba-----	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
761C:				
Hedoes-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim
Belain-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: small stones
761E:				
Hedoes-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim
Belain-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: small stones, slope
793B:				
Yamacall-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones

Construction Materials--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
793C: Yamacall-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones
795C: Yamacall-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones
Benz-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: excess salt
795D: Yamacall-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones
Benz-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: excess salt
801B: Williams-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones
Vida-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
801C: Williams-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones
Vida-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
828A: Savage-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
842A: Savage-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Daglum-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt, excess sodium
863E: Work-----	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, slope
Roy-----	Poor: large stones	Improbable: excess fines, large stones	Improbable: excess fines, large stones	Poor: small stones, area reclaim, slope
871B: Tamaneen-----	Good	Improbable: small stones	Probable	Poor: small stones, area reclaim

Construction Materials--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
871C: Tamaneen-----	Good	Improbable: small stones	Probable	Poor: small stones, area reclaim
883F: Perma-----	Poor: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
Whitlash-----	Poor: depth to rock, large stones, slope	Improbable: excess fines, large stones	Improbable: excess fines, large stones	Poor: depth to rock, large stones, slope
892F: Whitlash-----	Poor: depth to rock, large stones, slope	Improbable: excess fines, large stones	Improbable: excess fines, large stones	Poor: depth to rock, large stones, slope
Belain-----	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, slope
Rock outcrop----				
895F: Belain-----	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, slope
Whitlash-----	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, small stones, slope
Hedoes-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
896E: Belain-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: small stones, slope
Whitlash-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, small stones, slope
Rock outcrop----				
911F: Belain-----	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, slope

Construction Materials--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
911F: (cont.)				
Whitlash-----	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, small stones, slope
Hedoes-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
916C:				
Belain-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: small stones
Hedoes-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim
925F:				
Sunburst-----	Poor: low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, slope
Lambeth-----	Poor: low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
941D:				
Busby-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: slope
Twilight-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, thin layer, slope
943C:				
Tally-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: small stones
943E:				
Tally-----	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
Vebar-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope
943F:				
Tally-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
Cohagen-----	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
965F:				
Cabba-----	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope

Construction Materials--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
965F: (cont.)				
Macar-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
971F:				
Neldore-----	Poor: depth to rock, low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey, slope
Bascovy-----	Poor: depth to rock, low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, slope
972F:				
Neldore-----	Poor: depth to rock, low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey, slope
Rock outcrop----				
974F:				
Neldore-----	Poor: depth to rock, low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey, slope
Hillon-----	Poor: low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: slope

Water Management

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
2:							
Riverwash-----							
2B:							
Marcott-----	Slight	Moderate: hard to pack, wetness, excess salt	Severe: slow refill	Percs slowly, Frost action, Excess salt	Wetness, Droughty, Percs slowly	Erodes easily, Wetness, Percs slowly	Excess salt, Erodes easily, Droughty
Bigsandy-----	Slight	Severe: piping, wetness	Severe: slow refill, cutbanks cave	Percs slowly, Flooding, Frost action	Wetness, Droughty, Percs slowly	Erodes easily, Wetness, Too sandy	Wetness, Excess salt, Erodes easily
12C:							
Beaverton-----	Severe: seepage	Severe: seepage, large stones	Severe: no water	Deep to water	Slope, Large stones, Droughty	Large stones, Too sandy	Large stones, Droughty, Rooting depth
Beaverton-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Slope, Large stones, Droughty	Large stones, Too sandy	Large stones, Droughty, Rooting depth
13C:							
Tanna-----	Moderate: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, Percs slowly, Depth to rock	Depth to rock, Erodes easily, Percs slowly	Too arid, Erodes easily, Depth to rock
15E:							
Lambeth-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, Erodes easily	Slope, Erodes easily	Too arid, Slope, Erodes easily
15F:							
Lambeth-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, Erodes easily	Slope, Erodes easily	Too arid, Slope, Erodes easily
16B:							
Degrad-----	Severe: seepage	Severe: seepage, piping	Severe: no water	Deep to water	Erodes easily	Erodes easily, Too sandy	Too arid, Erodes easily
17B:							
Delpoint-----	Moderate: seepage, depth to rock	Severe: piping	Severe: no water	Deep to water	Depth to rock, Erodes easily	Depth to rock, Erodes easily	Too arid, Erodes easily, Depth to rock
21E:							
Cabbart-----	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, Depth to rock, Erodes easily	Slope, Depth to rock, Erodes easily	Too arid, Slope, Erodes easily
Delpoint-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, Depth to rock, Erodes easily	Slope, Depth to rock, Erodes easily	Too arid, Slope, Erodes easily

Water Management--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
22F: Hillon-----	Severe: slope	Moderate: piping	Severe: no water	Deep to water	Slope, Percs slowly, Erodes easily	Slope, Erodes easily, Percs slowly	Too arid, Slope, Erodes easily
27B: Attewan-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Erodes easily	Erodes easily, Too sandy	Too arid, Erodes easily
28: Nishon-----	Slight	Severe: ponding	Severe: no water	Ponding, Percs slowly	Ponding, Percs slowly, Erodes easily	Erodes easily, Ponding, Percs slowly	Wetness, Erodes easily, Percs slowly
30B: Marvan-----	Slight	Severe: hard to pack	Severe: no water	Deep to water	Slow intake, Percs slowly, Erodes easily	Erodes easily, Percs slowly	Erodes easily, Percs slowly
30C: Marvan-----	Moderate: slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, Slow intake, Percs slowly	Erodes easily, Percs slowly	Erodes easily, Percs slowly
31A: Ferd-----	Slight	Moderate: piping	Severe: no water	Deep to water	Percs slowly, Erodes easily, Excess salt	Erodes easily, Percs slowly	Too arid, Erodes easily, Percs slowly
32B: Kobase-----	Slight	Slight	Severe: no water	Deep to water	Percs slowly, Erodes easily	Erodes easily, Percs slowly	Too arid, Erodes easily, Percs slowly
32C: Kobase-----	Moderate: slope	Slight	Severe: no water	Deep to water	Slope, Percs slowly, Erodes easily	Erodes easily, Percs slowly	Too arid, Erodes easily, Percs slowly
32D: Kobase-----	Severe: slope	Slight	Severe: no water	Deep to water	Slope, Percs slowly, Erodes easily	Slope, Erodes easily, Percs slowly	Too arid, Slope, Erodes easily
33A: Phillips-----	Slight	Severe: piping	Severe: no water	Deep to water	Percs slowly, Rooting depth, Erodes easily	Erodes easily, Percs slowly	Too arid, Erodes easily, Rooting depth
34A: Linnet-----	Slight	Moderate: hard to pack	Severe: no water	Deep to water	Slow intake, Percs slowly	Percs slowly	Percs slowly
35B: Assinniboine----	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Soil blowing	Soil blowing	Too arid

Water Management--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
36B: Chinook-----	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Soil blowing	Soil blowing	Too arid
36C: Chinook-----	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Slope, Soil blowing	Soil blowing	Too arid
37B: Evanston-----	Moderate: seepage	Moderate: piping	Severe: no water	Deep to water	Erodes easily	Erodes easily	Too arid, Erodes easily
37C: Evanston-----	Moderate: seepage, slope	Moderate: piping	Severe: no water	Deep to water	Slope, Erodes easily	Erodes easily	Too arid, Erodes easily
38B: Ethridge-----	Slight	Moderate: piping	Severe: no water	Deep to water	Percs slowly, Erodes easily	Erodes easily, Percs slowly	Too arid, Erodes easily, Percs slowly
39B: Assinniboine----	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily	Erodes easily	Too arid, Erodes easily
43A: Pendroy-----	Slight	Severe: hard to pack	Severe: no water	Deep to water	Slow intake, Percs slowly, Erodes easily	Erodes easily, Percs slowly	Erodes easily, Percs slowly
44B: Kevin-----	Slight	Moderate: piping	Severe: no water	Deep to water	Percs slowly, Rooting depth, Erodes easily	Erodes easily, Percs slowly	Too arid, Erodes easily, Rooting depth
47B: Marias-----	Slight	Severe: hard to pack	Severe: no water	Deep to water	Slow intake, Percs slowly, Erodes easily	Erodes easily, Percs slowly	Erodes easily, Percs slowly
47C: Marias-----	Moderate: slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, Slow intake, Percs slowly	Erodes easily, Percs slowly	Erodes easily, Percs slowly
48A: Vanda-----	Slight	Severe: hard to pack	Severe: no water	Deep to water	Droughty, Slow intake, Percs slowly	Erodes easily, Percs slowly	Too arid, Excess salt, Erodes easily
48C: Vanda-----	Moderate: slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, Droughty, Slow intake	Erodes easily, Percs slowly	Too arid, Excess salt, Erodes easily

Water Management--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
50A: Telstad-----	Slight	Severe: piping	Severe: no water	Deep to water	Percs slowly, Erodes easily	Erodes easily	Too arid, Erodes easily, Percs slowly
55B: Lihen-----	Severe: seepage	Severe: seepage, piping	Severe: no water	Deep to water	Slope, Droughty, Fast intake	Too sandy, Soil blowing	Droughty
56A: Scobey-----	Slight	Slight	Severe: no water	Deep to water	Percs slowly, Rooting depth, Erodes easily	Erodes easily, Percs slowly	Too arid, Erodes easily, Rooting depth
57B: Absarokee-----	Moderate: depth to rock	Severe: thin layer	Severe: no water	Deep to water	Depth to rock	Depth to rock, Erodes easily	Erodes easily, Depth to rock
57C: Absarokee-----	Moderate: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, Depth to rock	Depth to rock, Erodes easily	Erodes easily, Depth to rock
57E: Absarokee-----	Severe: slope	Severe: thin layer	Severe: no water	Deep to water	Slope, Depth to rock	Slope, Depth to rock, Erodes easily	Slope, Erodes easily, Depth to rock
Reeder-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, Depth to rock	Slope, Depth to rock	Slope, Depth to rock
58B: Lonna-----	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Excess salt	Erodes easily	Too arid, Erodes easily
58C: Lonna-----	Moderate: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, Excess salt	Erodes easily	Too arid, Erodes easily
60A: Havre-----	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily	Erodes easily	Too arid, Erodes easily
63: Lardell-----	Slight	Severe: wetness	Severe: slow refill	Percs slowly, Frost action, Excess salt	Wetness, Droughty, Slow intake	Erodes easily, Wetness	Too arid, Wetness, Excess salt
67B: Bearpaw-----	Slight	Moderate: hard to pack	Severe: no water	Deep to water	Percs slowly, Rooting depth, Erodes easily	Erodes easily, Percs slowly	Erodes easily, Rooting depth, Percs slowly
67C: Bearpaw-----	Moderate: slope	Moderate: hard to pack	Severe: no water	Deep to water	Slope, Percs slowly, Rooting depth	Erodes easily, Percs slowly	Erodes easily, Rooting depth, Percs slowly

Water Management--Continued

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Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
68B:							
Gerber-----	Slight	Moderate: hard to pack	Severe: no water	Deep to water	Slow intake, Percs slowly	Erodes easily, Percs slowly	Erodes easily, Percs slowly
69C:							
Vida-----	Moderate: slope	Moderate: piping	Severe: no water	Deep to water	Slope, Percs slowly, Erodes easily	Erodes easily, Percs slowly	Erodes easily, Percs slowly
Zahill-----	Moderate: slope	Severe: piping	Severe: no water	Deep to water	Slope, Percs slowly, Rooting depth	Erodes easily, Percs slowly	Erodes easily, Rooting depth, Percs slowly
71D:							
Roy-----	Severe: slope	Severe: large stones	Severe: no water	Deep to water	Slope, Large stones, Droughty	Slope, Large stones	Large stones, Slope, Droughty
72F:							
Zahill-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, Percs slowly, Rooting depth	Slope, Erodes easily, Percs slowly	Slope, Erodes easily, Rooting depth
73B:							
Yetull-----	Severe: seepage	Severe: seepage, piping	Severe: no water	Deep to water	Slope, Droughty, Fast intake	Too sandy, Soil blowing	Too arid, Droughty
Lonesome-----	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Slope, Droughty, Fast intake	Erodes easily, Soil blowing, Percs slowly	Too arid, Erodes easily, Droughty
74C:							
Shambo-----	Moderate: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope	Erodes easily	Erodes easily
75B:							
Farnuf-----	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily	Erodes easily	Erodes easily
75C:							
Farnuf-----	Moderate: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, Erodes easily	Erodes easily	Erodes easily
76C:							
Hedoes-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Slope	Favorable	Favorable
77F:							
Tinsley-----	Severe: seepage, slope	Severe: seepage, large stones	Severe: no water	Deep to water	Slope, Large stones, Droughty	Slope, Large stones, Too sandy	Large stones, Slope, Droughty
79B:							
Yamacall-----	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily	Erodes easily	Too arid, Erodes easily

Water Management--Continued

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Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
79C:							
Yamacall-----	Moderate: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, Erodes easily	Erodes easily	Too arid, Erodes easily
79D:							
Yamacall-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, Erodes easily	Slope, Erodes easily	Too arid, Slope, Erodes easily
81A:							
Glendive-----	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Soil blowing, Excess salt	Too sandy, Soil blowing	Too arid
82B:							
Savage-----	Slight	Moderate: piping	Severe: no water	Deep to water	Percs slowly, Erodes easily	Erodes easily, Percs slowly	Erodes easily, Percs slowly
86B:							
Work-----	Slight	Severe: piping	Severe: no water	Deep to water	Favorable	Favorable	Favorable
86C:							
Work-----	Moderate: slope	Severe: piping	Severe: no water	Deep to water	Slope	Favorable	Favorable
86D:							
Work-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope	Slope	Slope
87B:							
Tamaneen-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Favorable	Favorable	Favorable
88C:							
Pezma-----	Severe: seepage	Moderate: thin layer, seepage, piping	Severe: no water	Deep to water	Slope, Large stones, Droughty	Large stones	Large stones, Droughty
90A:							
Harlake-----	Slight	Severe: hard to pack	Severe: no water	Deep to water	Slow intake, Percs slowly	Erodes easily, Percs slowly	Too arid, Erodes easily, Percs slowly
92E:							
Sunburst-----	Severe: slope	Slight	Severe: no water	Deep to water	Slope, Percs slowly, Erodes easily	Slope, Erodes easily, Percs slowly	Too arid, Slope, Erodes easily
Bascovy-----	Severe: slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, Slow intake, Percs slowly	Slope, Depth to rock, Erodes easily	Slope, Erodes easily, Depth to rock
93F:							
Yetull-----	Severe: seepage, slope	Severe: seepage, piping	Severe: no water	Deep to water	Slope, Droughty, Soil blowing	Slope, Too sandy, Soil blowing	Too arid, Slope, Droughty

Water Management--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
94B: Busby-----	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Soil blowing	Too sandy, Soil blowing	Too arid
94C: Busby-----	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Slope, Soil blowing	Too sandy, Soil blowing	Too arid
94D: Busby-----	Severe: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, Soil blowing	Slope, Too sandy, Soil blowing	Too arid, Slope
96B: Macar-----	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily	Erodes easily	Erodes easily
96C: Macar-----	Moderate: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, Erodes easily	Erodes easily	Erodes easily
98B: Kremlin-----	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily	Erodes easily	Too arid, Erodes easily
98C: Kremlin-----	Moderate: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, Erodes easily	Erodes easily	Too arid, Erodes easily
99: Rivra-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Large stones, Droughty, Soil blowing	Large stones, Too sandy, Soil blowing	Too arid, Large stones, Droughty
Hanly-----	Severe: seepage	Severe: seepage, piping	Severe: no water	Deep to water	Droughty, Fast intake, Soil blowing	Too sandy, Soil blowing	Too arid, Droughty
110C: Laceycreek-----	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Slope	Erodes easily	Erodes easily
110D: Laceycreek-----	Severe: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope	Slope, Erodes easily	Slope, Erodes easily
110E: Laceycreek-----	Severe: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope	Slope, Erodes easily	Slope, Erodes easily
130A: Nesda-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Droughty, Flooding	Large stones, Too sandy	Large stones, Droughty

Water Management--Continued

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Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
130A: (cont.)							
Nesda-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Droughty, Soil blowing, Flooding	Large stones, Too sandy, Soil blowing	Large stones, Droughty
McIlwaine-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Droughty, Soil blowing, Flooding	Too sandy, Soil blowing	Droughty
140A:							
Klayent-----	Moderate: seepage	Severe: wetness	Severe: slow refill	Percs slowly, Frost action	Wetness, Percs slowly, Excess salt	Erodes easily, Wetness	Wetness, Erodes easily, Percs slowly
141B:							
Megonot-----	Moderate: depth to rock	Severe: thin layer	Severe: no water	Deep to water	Percs slowly, Depth to rock, Erodes easily	Depth to rock, Erodes easily, Percs slowly	Too arid, Erodes easily, Depth to rock
Weingart-----	Moderate: depth to rock	Severe: excess sodium	Severe: no water	Deep to water	Percs slowly, Depth to rock, Erodes easily	Depth to rock, Erodes easily, Percs slowly	Too arid, Excess sodium, Erodes easily
Delpoint-----	Moderate: seepage, depth to rock	Severe: piping	Severe: no water	Deep to water	Depth to rock, Erodes easily	Depth to rock, Erodes easily	Too arid, Erodes easily, Depth to rock
142C:							
Megonot-----	Moderate: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, Percs slowly, Depth to rock	Depth to rock, Erodes easily, Percs slowly	Too arid, Erodes easily, Depth to rock
Kobase-----	Moderate: slope	Slight	Severe: no water	Deep to water	Slope, Percs slowly, Erodes easily	Erodes easily, Percs slowly	Too arid, Erodes easily, Percs slowly
Delpoint-----	Moderate: seepage, depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, Depth to rock, Erodes easily	Depth to rock, Erodes easily	Too arid, Erodes easily, Depth to rock
160A:							
Bigsandy-----	Slight	Severe: piping, wetness	Severe: slow refill, cutbanks cave	Percs slowly, Flooding, Frost action	Wetness, Percs slowly, Erodes easily	Erodes easily, Wetness, Too sandy	Wetness, Erodes easily, Percs slowly
171C:							
Delpoint-----	Moderate: seepage, depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, Depth to rock, Erodes easily	Depth to rock, Erodes easily	Too arid, Erodes easily, Depth to rock
Cahbart-----	Severe: depth to rock	Severe: piping	Severe: no water	Deep to water	Slope, Depth to rock, Erodes easily	Depth to rock, Erodes easily	Too arid, Erodes easily, Depth to rock
180A:							
McIlwaine-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Droughty, Soil blowing	Too sandy, Soil blowing	Droughty

Water Management--Continued

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Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
180A: (cont.)							
Nesda-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Droughty	Large stones, Too sandy	Large stones, Droughty
Straw-----	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Favorable	Erodes easily	Erodes easily
182F:							
Megonot-----	Severe: slope	Severe: thin layer	Severe: no water	Deep to water	Slope, Percs slowly, Depth to rock	Slope, Depth to rock, Erodes easily	Too arid, Slope, Erodes easily
Yawdim-----	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, Percs slowly, Depth to rock	Slope, Depth to rock, Erodes easily	Too arid, Slope, Erodes easily
200:							
Badland-----							
201F:							
Cabba-----	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, Depth to rock, Erodes easily	Slope, Depth to rock, Erodes easily	Slope, Erodes easily, Depth to rock
Wayden-----	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, Percs slowly, Depth to rock	Slope, Depth to rock, Erodes easily	Slope, Erodes easily, Depth to rock
Rock outcrop---							
210C:							
Shane-----	Moderate: depth to rock, slope	Moderate: thin layer, hard to pack	Severe: no water	Deep to water	Slope, Percs slowly, Depth to rock	Depth to rock, Erodes easily, Percs slowly	Erodes easily, Depth to rock, Percs slowly
Gerber-----	Moderate: slope	Moderate: hard to pack	Severe: no water	Deep to water	Slope, Slow intake, Percs slowly	Erodes easily, Percs slowly	Erodes easily, Percs slowly
210E:							
Shane-----	Severe: slope	Moderate: thin layer, hard to pack	Severe: no water	Deep to water	Slope, Percs slowly, Depth to rock	Slope, Depth to rock, Erodes easily	Slope, Erodes easily, Depth to rock
Barkof-----	Severe: slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, Slow intake, Percs slowly	Slope, Depth to rock, Erodes easily	Slope, Erodes easily, Depth to rock
Gerber-----	Severe: slope	Moderate: hard to pack	Severe: no water	Deep to water	Slope, Slow intake, Percs slowly	Slope, Erodes easily, Percs slowly	Slope, Erodes easily, Percs slowly
211F:							
Cabbart-----	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, Depth to rock, Erodes easily	Slope, Depth to rock, Erodes easily	Too arid, Slope, Erodes easily
Yawdim-----	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, Percs slowly, Depth to rock	Slope, Depth to rock, Erodes easily	Too arid, Slope, Erodes easily

Water Management--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
211F: (cont.)							
Rock outcrop----							
212F:							
Cabhart-----	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, Depth to rock, Erodes easily	Slope, Depth to rock, Erodes easily	Too arid, Slope, Erodes easily
Hillon-----	Severe: slope	Moderate: piping	Severe: no water	Deep to water	Slope, Peres slowly, Erodes easily	Slope, Erodes easily, Peres slowly	Too arid, Slope, Erodes easily
221E:							
Hillon-----	Severe: slope	Moderate: piping	Severe: no water	Deep to water	Slope, Peres slowly, Erodes easily	Slope, Erodes easily, Peres slowly	Too arid, Slope, Erodes easily
Kevin-----	Severe: slope	Moderate: piping	Severe: no water	Deep to water	Slope, Peres slowly, Rooting depth	Slope, Erodes easily, Peres slowly	Too arid, Slope, Erodes easily
222D:							
Hillon-----	Severe: slope	Moderate: piping	Severe: no water	Deep to water	Slope, Peres slowly, Erodes easily	Slope, Erodes easily, Peres slowly	Too arid, Slope, Erodes easily
Delpoint-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, Depth to rock, Erodes easily	Slope, Depth to rock, Erodes easily	Too arid, Slope, Erodes easily
223E:							
Hillon-----	Severe: slope	Moderate: piping	Severe: no water	Deep to water	Slope, Peres slowly, Erodes easily	Slope, Erodes easily, Peres slowly	Too arid, Slope, Erodes easily
Fleak-----	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, Droughty, Fast intake	Slope, Depth to rock, Too sandy	Too arid, Slope, Droughty
224E:							
Hillon-----	Severe: slope	Moderate: piping	Severe: no water	Deep to water	Slope, Peres slowly, Erodes easily	Slope, Erodes easily, Peres slowly	Too arid, Slope, Erodes easily
Joplin-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, Peres slowly, Rooting depth	Slope, Erodes easily	Too arid, Slope, Erodes easily
227F:							
Hillon-----	Severe: slope	Moderate: piping	Severe: no water	Deep to water	Slope, Peres slowly, Erodes easily	Slope, Erodes easily, Peres slowly	Too arid, Slope, Erodes easily
Fleak-----	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, Droughty, Fast intake	Slope, Depth to rock, Too sandy	Too arid, Slope, Droughty
Rock outcrop----							

Water Management--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
229E:							
Hillon-----	Severe: slope	Moderate: piping	Severe: no water	Deep to water	Slope, Percs slowly, Erodes easily	Slope, Erodes easily, Percs slowly	Too arid, Slope, Erodes easily
Lambeth-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, Erodes easily	Slope, Erodes easily	Too arid, Slope, Erodes easily
232A:							
Acel-----	Slight	Slight	Severe: no water	Deep to water	Percs slowly, Erodes easily	Erodes easily, Percs slowly	Erodes easily, Percs slowly
251C:							
Bascovy-----	Moderate: depth to rock, slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, Slow intake, Percs slowly	Depth to rock, Erodes easily, Percs slowly	Erodes easily, Depth to rock, Percs slowly
Neldore-----	Severe: depth to rock	Severe: thin layer	Severe: no water	Deep to water	Slope, Slow intake, Percs slowly	Depth to rock, Percs slowly	Too arid, Depth to rock, Percs slowly
251E:							
Bascovy-----	Severe: slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, Slow intake, Percs slowly	Slope, Depth to rock, Erodes easily	Slope, Erodes easily, Depth to rock
Neldore-----	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, Slow intake, Percs slowly	Slope, Depth to rock, Percs slowly	Too arid, Slope, Depth to rock
252C:							
Bascovy-----	Moderate: depth to rock, slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, Slow intake, Percs slowly	Depth to rock, Erodes easily, Percs slowly	Erodes easily, Depth to rock, Percs slowly
Marvan-----	Moderate: slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, Slow intake, Percs slowly	Erodes easily, Percs slowly	Erodes easily, Percs slowly
261B:							
Absher-----	Slight	Severe: excess sodium	Severe: no water	Deep to water	Droughty, Slow intake, Percs slowly	Erodes easily, Percs slowly	Too arid, Excess salt, Excess sodium
Nobe-----	Slight	Moderate: hard to pack, excess salt	Severe: no water	Deep to water	Droughty, Slow intake, Percs slowly	Erodes easily, Percs slowly	Too arid, Excess salt, Erodes easily
263A:							
Toston-----	Moderate: seepage	Severe: piping, excess sodium	Severe: slow refill	Deep to water	Percs slowly, Erodes easily, Excess sodium	Erodes easily	Too arid, Excess salt, Excess sodium
264A:							
Toston-----	Moderate: seepage	Severe: piping, excess sodium	Severe: slow refill	Deep to water	Percs slowly, Erodes easily, Excess sodium	Erodes easily	Too arid, Excess salt, Excess sodium

Water Management--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
264A: (cont.)							
Nobe-----	Slight	Moderate: hard to pack, excess salt	Severe: slow refill	Deep to water	Droughty, Slow intake, Percs slowly	Erodes easily, Percs slowly	Too arid, Excess salt, Erodes easily
265B:							
Absher-----	Slight	Severe: excess sodium	Severe: no water	Deep to water	Droughty, Slow intake, Percs slowly	Erodes easily, Percs slowly	Too arid, Excess salt, Excess sodium
Gerdrum-----	Slight	Severe: excess sodium	Severe: no water	Deep to water	Droughty, Percs slowly, Erodes easily	Erodes easily, Percs slowly	Too arid, Excess sodium, Erodes easily
272C:							
Attewan-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Slope, Erodes easily	Erodes easily, Too sandy	Too arid, Erodes easily
Tinsley-----	Severe: seepage	Severe: seepage, large stones	Severe: no water	Deep to water	Slope, Large stones, Droughty	Large stones, Too sandy, Soil blowing	Large stones, Droughty
301A:							
Marvan-----	Slight	Severe: hard to pack	Severe: no water	Deep to water	Slow intake, Percs slowly, Erodes easily	Erodes easily, Percs slowly	Erodes easily, Percs slowly
Vanda-----	Slight	Severe: hard to pack	Severe: no water	Deep to water	Droughty, Slow intake, Percs slowly	Erodes easily, Percs slowly	Too arid, Excess salt, Erodes easily
301C:							
Marvan-----	Moderate: slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, Slow intake, Percs slowly	Erodes easily, Percs slowly	Erodes easily, Percs slowly
Vanda-----	Moderate: slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, Droughty, Slow intake	Erodes easily, Percs slowly	Too arid, Excess salt, Erodes easily
303A:							
Flatcreek-----	Slight	Severe: hard to pack	Severe: slow refill	Deep to water	Slow intake, Percs slowly, Erodes easily	Erodes easily, Percs slowly	Erodes easily, Percs slowly
Nobe-----	Slight	Moderate: hard to pack, excess salt	Severe: slow refill	Deep to water	Droughty, Slow intake, Percs slowly	Erodes easily, Percs slowly	Too arid, Excess salt, Erodes easily
305A:							
Marvan-----	Slight	Severe: hard to pack	Severe: no water	Deep to water	Slow intake, Percs slowly, Erodes easily	Erodes easily, Percs slowly	Excess salt, Erodes easily, Percs slowly
Nobe-----	Slight	Moderate: hard to pack, excess salt	Severe: no water	Deep to water	Droughty, Slow intake, Percs slowly	Erodes easily, Percs slowly	Too arid, Excess salt, Erodes easily

Water Management--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
311B:							
Ferd-----	Slight	Moderate: piping	Severe: no water	Deep to water	Percs slowly, Erodes easily, Excess salt	Erodes easily, Percs slowly	Too arid, Erodes easily, Percs slowly
Creed-----	Slight	Severe: excess sodium	Severe: no water	Deep to water	Droughty, Percs slowly, Erodes easily	Erodes easily, Percs slowly	Too arid, Excess sodium, Erodes easily
Gerdum-----	Slight	Severe: excess sodium	Severe: no water	Deep to water	Droughty, Percs slowly, Erodes easily	Erodes easily, Percs slowly	Too arid, Excess sodium, Erodes easily
311C:							
Ferd-----	Moderate: slope	Moderate: piping	Severe: no water	Deep to water	Slope, Percs slowly, Erodes easily	Erodes easily, Percs slowly	Too arid, Erodes easily, Percs slowly
Creed-----	Moderate: slope	Severe: excess sodium	Severe: no water	Deep to water	Slope, Droughty, Percs slowly	Erodes easily, Percs slowly	Too arid, Excess sodium, Erodes easily
Gerdum-----	Moderate: slope	Severe: excess sodium	Severe: no water	Deep to water	Slope, Droughty, Percs slowly	Erodes easily, Percs slowly	Too arid, Excess sodium, Erodes easily
323B:							
Sagedale-----	Slight	Slight	Severe: no water	Deep to water	Percs slowly, Erodes easily	Erodes easily, Percs slowly	Erodes easily, Percs slowly
323C:							
Sagedale-----	Moderate: slope	Slight	Severe: no water	Deep to water	Slope, Percs slowly, Erodes easily	Erodes easily, Percs slowly	Erodes easily, Percs slowly
324B:							
Marcott-----	Slight	Moderate: hard to pack, wetness	Severe: slow refill	Percs slowly, Frost action	Wetness, Percs slowly, Excess salt	Erodes easily, Wetness, Percs slowly	Erodes easily, Percs slowly
331B:							
Phillips-----	Slight	Severe: piping	Severe: no water	Deep to water	Percs slowly, Rooting depth, Erodes easily	Erodes easily, Percs slowly	Too arid, Erodes easily, Rooting depth
Elloam-----	Slight	Severe: excess sodium	Severe: no water	Deep to water	Droughty, Percs slowly, Rooting depth	Erodes easily, Percs slowly	Too arid, Excess sodium, Erodes easily
331C:							
Phillips-----	Moderate: slope	Severe: piping	Severe: no water	Deep to water	Slope, Percs slowly, Rooting depth	Erodes easily, Percs slowly	Too arid, Erodes easily, Rooting depth
Elloam-----	Moderate: slope	Severe: excess sodium	Severe: no water	Deep to water	Slope, Droughty, Percs slowly	Erodes easily, Percs slowly	Too arid, Excess sodium, Erodes easily

Water Management--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
334B:							
Phillips-----	Slight	Severe: piping	Severe: no water	Deep to water	Percs slowly, Rooting depth, Erodes easily	Erodes easily, Percs slowly	Too arid, Erodes easily, Rooting depth
Kevin-----	Slight	Moderate: piping	Severe: no water	Deep to water	Percs slowly, Rooting depth, Erodes easily	Erodes easily, Percs slowly	Too arid, Erodes easily, Rooting depth
341B:							
Linnet-----	Slight	Moderate: hard to pack	Severe: no water	Deep to water	Slow intake, Percs slowly	Percs slowly	Percs slowly
Marias-----	Slight	Severe: hard to pack	Severe: no water	Deep to water	Slow intake, Percs slowly, Erodes easily	Erodes easily, Percs slowly	Erodes easily, Percs slowly
351B:							
Kenilworth-----	Slight	Moderate: piping	Severe: no water	Deep to water	Soil blowing, Percs slowly	Erodes easily, Soil blowing, Percs slowly	Too arid, Erodes easily, Percs slowly
Fortbenton-----	Severe: seepage	Moderate: piping	Severe: no water	Deep to water	Soil blowing, Percs slowly	Erodes easily, Soil blowing, Percs slowly	Too arid, Erodes easily, Percs slowly
361B:							
Fortbenton-----	Severe: seepage	Moderate: piping	Severe: no water	Deep to water	Soil blowing, Percs slowly	Erodes easily, Soil blowing, Percs slowly	Too arid, Erodes easily, Percs slowly
362C:							
Chinook-----	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Slope, Soil blowing	Soil blowing	Too arid
Yetull-----	Severe: seepage	Severe: seepage, piping	Severe: no water	Deep to water	Slope, Droughty, Fast intake	Too sandy, Soil blowing	Too arid, Droughty
363B:							
Cozberg-----	Severe: seepage	Severe: seepage, piping	Severe: no water	Deep to water	Soil blowing	Too sandy, Soil blowing	Too arid
Chinook-----	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Soil blowing	Soil blowing	Too arid
363C:							
Chinook-----	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Slope, Soil blowing	Soil blowing	Too arid
Lihen-----	Severe: seepage	Severe: seepage, piping	Severe: no water	Deep to water	Slope, Droughty, Soil blowing	Too sandy, Soil blowing	Droughty
364B:							
Chinook-----	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Favorable	Favorable	Too arid

Water Management--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
364C: Chinook-----	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Slope	Favorable	Too arid
365B: Fortbenton-----	Severe: seepage	Moderate: piping	Severe: no water	Deep to water	Slope, Soil blowing, Percs slowly	Erodes easily, Soil blowing, Percs slowly	Too arid, Erodes easily, Percs slowly
Chinook-----	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Slope, Soil blowing	Soil blowing	Too arid
368C: Fortbenton-----	Severe: seepage	Moderate: piping	Severe: no water	Deep to water	Slope, Soil blowing, Percs slowly	Erodes easily, Soil blowing, Percs slowly	Too arid, Erodes easily, Percs slowly
Hillon-----	Moderate: slope	Moderate: piping	Severe: no water	Deep to water	Slope, Percs slowly, Erodes easily	Erodes easily, Percs slowly	Too arid, Erodes easily, Percs slowly
372C: Evanston-----	Moderate: seepage, slope	Moderate: piping	Severe: no water	Deep to water	Slope, Erodes easily	Erodes easily	Too arid, Erodes easily
Yamacall-----	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Slope, Erodes easily	Erodes easily	Too arid, Erodes easily
375B: Evanston-----	Moderate: seepage	Moderate: piping	Severe: no water	Deep to water	Erodes easily	Erodes easily	Too arid, Erodes easily
Lonna-----	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily, Excess salt	Erodes easily	Too arid, Erodes easily
377B: Evanston-----	Moderate: seepage	Moderate: piping	Severe: no water	Deep to water	Erodes easily	Erodes easily	Too arid, Erodes easily
Degrad-----	Severe: seepage	Severe: seepage, piping	Severe: no water	Deep to water	Erodes easily	Erodes easily, Too sandy	Too arid, Erodes easily
381B: Ethridge-----	Slight	Slight	Severe: no water	Deep to water	Percs slowly, Erodes easily	Erodes easily, Percs slowly	Too arid, Erodes easily, Percs slowly
385B: Ethridge-----	Slight	Moderate: piping	Severe: no water	Deep to water	Percs slowly, Erodes easily	Erodes easily, Percs slowly	Too arid, Erodes easily, Percs slowly
Kobase-----	Slight	Slight	Severe: no water	Deep to water	Percs slowly, Erodes easily	Erodes easily, Percs slowly	Too arid, Erodes easily, Percs slowly

Water Management--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
386B:							
Ethridge-----	Slight	Moderate: piping	Severe: no water	Deep to water	Percs slowly, Erodes easily	Erodes easily, Percs slowly	Too arid, Erodes easily, Percs slowly
Evanston-----	Moderate: seepage	Moderate: piping	Severe: no water	Deep to water	Erodes easily	Erodes easily	Too arid, Erodes easily
388A:							
Ethridge-----	Slight	Moderate: piping	Severe: no water	Deep to water	Percs slowly, Erodes easily	Erodes easily, Percs slowly	Too arid, Erodes easily, Percs slowly
Lonna-----	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Excess salt	Erodes easily	Too arid, Erodes easily
402A:							
Gerdum-----	Slight	Severe: excess sodium	Severe: no water	Deep to water	Droughty, Percs slowly, Erodes easily	Erodes easily, Percs slowly	Too arid, Excess sodium, Erodes easily
Absher-----	Slight	Severe: excess sodium	Severe: no water	Deep to water	Droughty, Slow intake, Percs slowly	Erodes easily, Percs slowly	Too arid, Excess salt, Excess sodium
Creed-----	Slight	Severe: excess sodium	Severe: no water	Deep to water	Droughty, Percs slowly, Erodes easily	Erodes easily, Percs slowly	Too arid, Excess sodium, Erodes easily
410:							
Rock outcrop----							
Fleak-----	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, Droughty, Fast intake	Slope, Depth to rock, Too sandy	Too arid, Slope, Droughty
411D:							
Farnuf-----	Moderate: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope	Favorable	Favorable
Reeder-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, Depth to rock	Slope, Depth to rock, Erodes easily	Slope, Erodes easily, Depth to rock
411E:							
Reeder-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, Depth to rock	Slope, Depth to rock, Erodes easily	Slope, Erodes easily, Depth to rock
Farnuf-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope	Slope	Slope
421C:							
Joplin-----	Moderate: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, Percs slowly, Rooting depth	Erodes easily	Too arid, Erodes easily, Rooting depth

Water Management--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
421C: (cont.)							
Hillon-----	Moderate: slope	Moderate: piping	Severe: no water	Deep to water	Slope, Percs slowly, Erodes easily	Erodes easily, Percs slowly	Too arid, Erodes easily, Percs slowly
422C:							
Marmarth-----	Moderate: seepage, depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, Depth to rock, Erodes easily	Depth to rock, Erodes easily	Too arid, Erodes easily, Depth to rock
441C:							
Kevin-----	Moderate: slope	Moderate: piping	Severe: no water	Deep to water	Slope, Percs slowly, Rooting depth	Erodes easily, Percs slowly	Too arid, Erodes easily, Rooting depth
Hillon-----	Moderate: slope	Moderate: piping	Severe: no water	Deep to water	Slope, Percs slowly, Erodes easily	Erodes easily, Percs slowly	Too arid, Erodes easily, Percs slowly
442C:							
Kevin-----	Moderate: slope	Moderate: piping	Severe: no water	Deep to water	Slope, Percs slowly, Rooting depth	Erodes easily, Percs slowly	Too arid, Erodes easily, Rooting depth
Elloam-----	Moderate: slope	Severe: excess sodium	Severe: no water	Deep to water	Slope, Droughty, Percs slowly	Erodes easily, Percs slowly	Too arid, Excess sodium, Erodes easily
444D:							
Kevin-----	Severe: slope	Moderate: piping	Severe: no water	Deep to water	Slope, Percs slowly, Rooting depth	Slope, Erodes easily, Percs slowly	Too arid, Slope, Erodes easily
Scobey-----	Severe: slope	Slight	Severe: no water	Deep to water	Slope, Percs slowly, Rooting depth	Slope, Erodes easily, Percs slowly	Too arid, Slope, Erodes easily
451C:							
Turner-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Slope	Too sandy	Favorable
Beaverton-----	Severe: seepage	Severe: seepage, large stones	Severe: no water	Deep to water	Slope, Large stones, Droughty	Large stones, Too sandy	Large stones, Droughty, Rooting depth
460:							
Laceycreek-----	Severe: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope	Slope, Erodes easily	Slope, Erodes easily
471B:							
Marias-----	Slight	Severe: hard to pack	Severe: no water	Deep to water	Slow intake, Percs slowly, Erodes easily	Erodes easily, Percs slowly	Erodes easily, Percs slowly
Kobase-----	Slight	Slight	Severe: no water	Deep to water	Percs slowly, Erodes easily	Erodes easily, Percs slowly	Too arid, Erodes easily, Percs slowly

Water Management--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
481A: Bigsag-----	Slight	Severe: wetness, excess sodium	Severe: slow refill	Percs slowly, Excess salt, Excess sodium	Wetness, Droughty, Slow intake	Erodes easily, Wetness, Percs slowly	Wetness, Excess salt, Excess sodium
493A: Enbar-----	Severe: seepage	Severe: piping	Severe: cutbanks cave	Flooding, Frost action	Wetness, Flooding	Erodes easily, Wetness	Erodes easily
Straw-----	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Favorable	Erodes easily	Erodes easily
Eagleton-----	Moderate: seepage	Severe: piping, wetness	Moderate: slow refill	Flooding, Frost action	Wetness, Flooding	Erodes easily, Wetness	Wetness, Erodes easily
503B: Telstad-----	Slight	Severe: piping	Severe: no water	Deep to water	Percs slowly, Erodes easily	Erodes easily	Too arid, Erodes easily, Percs slowly
Joplin-----	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Percs slowly, Rooting depth, Erodes easily	Erodes easily	Too arid, Erodes easily, Rooting depth
503C: Telstad-----	Moderate: slope	Severe: piping	Severe: no water	Deep to water	Slope, Percs slowly, Erodes easily	Erodes easily	Too arid, Erodes easily, Percs slowly
Joplin-----	Moderate: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, Percs slowly, Rooting depth	Erodes easily	Too arid, Erodes easily, Rooting depth
510: Rock outcrop----							
Belain-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, Soil blowing, Depth to rock	Slope, Depth to rock, Soil blowing	Slope, Depth to rock
511A: Martinsdale----	Slight	Severe: piping	Severe: no water	Deep to water	Excess salt	Erodes easily	Erodes easily
Turner-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Favorable	Too sandy	Favorable
511C: Martinsdale----	Moderate: slope	Severe: piping	Severe: no water	Deep to water	Slope, Excess salt	Erodes easily	Erodes easily
512C: Martinsdale----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope	Slope, Erodes easily	Slope, Erodes easily
521B: Thoeny-----	Slight	Severe: excess sodium	Severe: no water	Deep to water	Percs slowly, Erodes easily, Excess sodium	Erodes easily, Percs slowly	Too arid, Excess sodium, Erodes easily

Water Management--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
521B: (cont.)							
Elloam-----	Slight	Severe: excess sodium	Severe: no water	Deep to water	Droughty, Percs slowly, Rooting depth	Erodes easily, Percs slowly	Too arid, Excess sodium, Erodes easily
Absher-----	Slight	Severe: excess sodium	Severe: no water	Deep to water	Droughty, Slow intake, Percs slowly	Erodes easily, Percs slowly	Too arid, Excess salt, Excess sodium
530F:							
Warwood-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, Erodes easily	Slope, Erodes easily	Slope, Erodes easily
531A:							
Sweetgrass-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Droughty	Large stones, Too sandy	Large stones, Droughty
Beaverton-----	Severe: seepage	Severe: seepage, large stones	Severe: no water	Deep to water	Large stones, Droughty, Rooting depth	Large stones, Too sandy	Large stones, Droughty, Rooting depth
531C:							
Sweetgrass-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Slope, Droughty	Large stones, Too sandy	Large stones, Droughty
Beaverton-----	Severe: seepage	Severe: seepage, large stones	Severe: no water	Deep to water	Slope, Large stones, Droughty	Large stones, Too sandy	Large stones, Droughty, Rooting depth
Beaverton-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Slope, Large stones, Droughty	Large stones, Too sandy	Large stones, Droughty, Rooting depth
550F:							
Libeg-----	Severe: slope	Severe: large stones	Severe: no water	Deep to water	Slope, Large stones, Droughty	Slope, Large stones	Large stones, Slope, Droughty
Arrowpeak-----	Severe: depth to rock, slope	Severe: seepage, large stones	Severe: no water	Deep to water	Slope, Large stones, Droughty	Slope, Large stones, Depth to rock	Large stones, Slope, Droughty
Elkner-----	Severe: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, Droughty, Soil blowing	Slope, Too sandy, Soil blowing	Slope, Droughty
551B:							
Lonesome-----	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Slope, Droughty, Fast intake	Erodes easily, Soil blowing, Percs slowly	Too arid, Erodes easily, Droughty
560F:							
Elve-----	Severe: seepage, slope	Severe: seepage, large stones	Severe: no water	Deep to water	Slope, Large stones, Droughty	Slope, Large stones	Large stones, Slope, Droughty
Rock outcrop----							

Water Management--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
561B: Scobey-----	Slight	Slight	Severe: no water	Deep to water	Percs slowly, Rooting depth, Erodes easily	Erodes easily, Percs slowly	Too arid, Erodes easily, Rooting depth
Kevin-----	Slight	Moderate: piping	Severe: no water	Deep to water	Percs slowly, Rooting depth, Erodes easily	Erodes easily, Percs slowly	Too arid, Erodes easily, Rooting depth
561C: Scobey-----	Moderate: slope	Slight	Severe: no water	Deep to water	Slope, Percs slowly, Rooting depth	Erodes easily, Percs slowly	Too arid, Erodes easily, Rooting depth
Kevin-----	Moderate: slope	Moderate: piping	Severe: no water	Deep to water	Slope, Percs slowly, Rooting depth	Erodes easily, Percs slowly	Too arid, Erodes easily, Rooting depth
562B: Scobey-----	Slight	Slight	Severe: no water	Deep to water	Percs slowly, Rooting depth, Erodes easily	Erodes easily, Percs slowly	Too arid, Erodes easily, Rooting depth
Linnet-----	Slight	Moderate: hard to pack	Severe: no water	Deep to water	Slow intake, Percs slowly	Percs slowly	Percs slowly
563A: Fortbenton-----	Severe: seepage	Moderate: piping	Severe: no water	Deep to water	Soil blowing, Percs slowly	Erodes easily, Soil blowing, Percs slowly	Too arid, Erodes easily, Percs slowly
Scobey-----	Slight	Slight	Severe: no water	Deep to water	Soil blowing, Percs slowly, Rooting depth	Erodes easily, Soil blowing, Percs slowly	Too arid, Erodes easily, Rooting depth
580F: Garlet-----	Severe: slope	Severe: seepage, large stones	Severe: no water	Deep to water	Slope, Large stones, Droughty	Slope, Large stones	Large stones, Slope, Droughty
Elkner-----	Severe: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, Droughty, Soil blowing	Slope, Too sandy, Soil blowing	Slope, Droughty
601A: Havre-----	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily	Erodes easily	Too arid, Erodes easily
Glendive-----	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Soil blowing, Excess salt	Too sandy, Soil blowing	Too arid
602A: Havre-----	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Favorable	Favorable	Too arid
603A: Havre-----	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily, Flooding	Erodes easily	Too arid, Erodes easily

Water Management--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
603A: (cont.)							
Glendive-----	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Soil blowing, Flooding	Too sandy, Soil blowing	Too arid
605C:							
Yamacall-----	Moderate: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, Erodes easily	Erodes easily	Too arid, Erodes easily
Havre-----	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily, Flooding	Erodes easily	Too arid, Erodes easily
621E:							
Sagedale-----	Severe: slope	Slight	Severe: no water	Deep to water	Slope, Peres slowly, Erodes easily	Slope, Erodes easily, Peres slowly	Slope, Erodes easily, Peres slowly
Wayden-----	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, Peres slowly, Depth to rock	Slope, Depth to rock, Erodes easily	Slope, Erodes easily, Depth to rock
621F:							
Wayden-----	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, Peres slowly, Depth to rock	Slope, Depth to rock, Erodes easily	Slope, Erodes easily, Depth to rock
Sagedale-----	Severe: slope	Slight	Severe: no water	Deep to water	Slope, Peres slowly, Erodes easily	Slope, Erodes easily, Peres slowly	Slope, Erodes easily, Peres slowly
623F:							
Linwell-----	Severe: slope	Slight	Severe: no water	Deep to water	Slope, Peres slowly	Slope, Erodes easily, Peres slowly	Slope, Erodes easily, Peres slowly
Winifred-----	Severe: slope	Moderate: thin layer, hard to pack	Severe: no water	Deep to water	Slope, Peres slowly, Depth to rock	Slope, Depth to rock, Peres slowly	Slope, Depth to rock, Peres slowly
630E:							
Crow-----	Severe: slope	Moderate: hard to pack	Severe: no water	Deep to water	Slope, Peres slowly, Erodes easily	Slope, Erodes easily, Peres slowly	Slope, Erodes easily, Peres slowly
Lubrecht-----	Severe: slope	Severe: thin layer	Severe: no water	Deep to water	Slope, Peres slowly, Depth to rock	Slope, Depth to rock, Erodes easily	Slope, Erodes easily, Depth to rock
641F:							
Norbert-----	Severe: depth to rock, slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, Slow intake, Peres slowly	Slope, Depth to rock, Erodes easily	Slope, Erodes easily, Depth to rock
Barkof-----	Severe: slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, Slow intake, Peres slowly	Slope, Depth to rock, Erodes easily	Slope, Erodes easily, Depth to rock

Water Management--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
650D:							
Laceycreek-----	Severe: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope	Slope, Erodes easily	Slope, Erodes easily
Ambrant-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, Droughty, Soil blowing	Slope, Soil blowing	Slope, Droughty
650F:							
Laceycreek-----	Severe: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope	Slope, Erodes easily	Slope, Erodes easily
Eaglecreek-----	Severe: slope	Severe: thin layer	Severe: no water	Deep to water	Slope, Depth to rock	Slope, Depth to rock	Slope, Depth to rock
653F:							
Fleak-----	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, Droughty, Fast intake	Slope, Depth to rock, Too sandy	Too arid, Slope, Droughty
Twilight-----	Severe: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, Soil blowing, Depth to rock	Slope, Depth to rock, Soil blowing	Too arid, Slope, Depth to rock
Yetull-----	Severe: seepage, slope	Severe: seepage, piping	Severe: no water	Deep to water	Slope, Droughty, Soil blowing	Slope, Too sandy, Soil blowing	Too arid, Slope, Droughty
654F:							
Fleak-----	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, Droughty, Fast intake	Slope, Depth to rock, Too sandy	Too arid, Slope, Droughty
Twilight-----	Severe: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, Soil blowing, Depth to rock	Slope, Depth to rock, Soil blowing	Too arid, Slope, Depth to rock
Rock outcrop----							
661E:							
Twilight-----	Severe: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, Soil blowing, Depth to rock	Slope, Depth to rock, Soil blowing	Too arid, Slope, Depth to rock
Fleak-----	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, Droughty, Fast intake	Slope, Depth to rock, Too sandy	Too arid, Slope, Droughty
671B:							
Bearpaw-----	Slight	Moderate: hard to pack	Severe: no water	Deep to water	Percs slowly, Rooting depth, Erodes easily	Erodes easily, Percs slowly	Erodes easily, Rooting depth, Percs slowly
Vida-----	Slight	Moderate: piping	Severe: no water	Deep to water	Percs slowly, Erodes easily	Erodes easily, Percs slowly	Erodes easily, Percs slowly

Water Management--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
671C:							
Bearpaw-----	Moderate: slope	Moderate: hard to pack	Severe: no water	Deep to water	Slope, Percs slowly, Rooting depth	Erodes easily, Percs slowly	Erodes easily, Rooting depth, Percs slowly
Vida-----	Moderate: slope	Moderate: piping	Severe: no water	Deep to water	Slope, Percs slowly, Erodes easily	Erodes easily, Percs slowly	Erodes easily, Percs slowly
673A:							
Bearpaw-----	Slight	Moderate: hard to pack	Severe: no water	Deep to water	Percs slowly, Rooting depth, Erodes easily	Erodes easily, Percs slowly	Erodes easily, Rooting depth, Percs slowly
Daglum-----	Slight	Severe: excess sodium	Severe: no water	Deep to water	Percs slowly, Erodes easily, Excess sodium	Erodes easily, Percs slowly	Excess sodium, Erodes easily, Percs slowly
674B:							
Bearpaw-----	Slight	Moderate: hard to pack	Severe: no water	Deep to water	Percs slowly, Rooting depth, Erodes easily	Erodes easily, Percs slowly	Erodes easily, Rooting depth, Percs slowly
Waltham-----	Slight	Severe: excess sodium	Severe: no water	Deep to water	Percs slowly, Rooting depth, Erodes easily	Erodes easily, Percs slowly	Excess sodium, Erodes easily, Rooting depth
680F:							
Winkler-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, Large stones, Droughty	Slope, Large stones, Soil blowing	Large stones, Slope, Droughty
Ambrant-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, Droughty, Soil blowing	Slope, Soil blowing	Slope, Droughty
Winkler-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, Large stones, Droughty	Slope, Large stones, Soil blowing	Large stones, Slope, Droughty
681C:							
Gerber-----	Moderate: slope	Moderate: hard to pack	Severe: no water	Deep to water	Slope, Slow intake, Percs slowly	Erodes easily, Percs slowly	Erodes easily, Percs slowly
691D:							
Vida-----	Severe: slope	Moderate: piping	Severe: no water	Deep to water	Slope, Percs slowly, Erodes easily	Slope, Erodes easily, Percs slowly	Slope, Erodes easily, Percs slowly
Williams-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, Percs slowly, Erodes easily	Slope, Erodes easily, Percs slowly	Slope, Erodes easily, Percs slowly
692D:							
Vida-----	Severe: slope	Moderate: piping	Severe: no water	Deep to water	Slope, Percs slowly, Erodes easily	Slope, Erodes easily, Percs slowly	Slope, Erodes easily, Percs slowly

Water Management--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
692D: (cont.)							
Bearpaw-----	Severe: slope	Moderate: hard to pack	Severe: no water	Deep to water	Slope, Percs slowly, Rooting depth	Slope, Erodes easily, Percs slowly	Slope, Erodes easily, Rooting depth
693C:							
Vida-----	Severe: slope	Moderate: piping	Severe: no water	Deep to water	Slope, Percs slowly, Erodes easily	Slope, Erodes easily, Percs slowly	Slope, Erodes easily, Percs slowly
Bearpaw-----	Moderate: slope	Moderate: hard to pack	Severe: no water	Deep to water	Slope, Percs slowly, Rooting depth	Erodes easily, Percs slowly	Erodes easily, Rooting depth, Percs slowly
Nishon-----	Slight	Severe: ponding	Severe: no water	Ponding, Percs slowly	Ponding, Percs slowly, Erodes easily	Erodes easily, Ponding, Percs slowly	Wetness, Erodes easily, Percs slowly
701E:							
Work-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope	Slope	Slope
Absarokee-----	Severe: slope	Severe: thin layer	Severe: no water	Deep to water	Slope, Depth to rock	Slope, Depth to rock, Erodes easily	Slope, Erodes easily, Depth to rock
702E:							
Work-----	Severe: slope	Moderate: thin layer, piping	Severe: no water	Deep to water	Slope	Slope	Slope
Absarokee-----	Severe: slope	Severe: thin layer	Severe: no water	Deep to water	Slope, Depth to rock	Slope, Depth to rock, Erodes easily	Slope, Erodes easily, Depth to rock
721E:							
Zahill-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, Percs slowly, Rooting depth	Slope, Erodes easily, Percs slowly	Slope, Erodes easily, Rooting depth
Vida-----	Severe: slope	Moderate: piping	Severe: no water	Deep to water	Slope, Percs slowly, Erodes easily	Slope, Erodes easily, Percs slowly	Slope, Erodes easily, Percs slowly
722F:							
Zahill-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, Percs slowly, Rooting depth	Slope, Erodes easily, Percs slowly	Slope, Erodes easily, Rooting depth
Sagedale-----	Severe: slope	Slight	Severe: no water	Deep to water	Slope, Percs slowly, Erodes easily	Slope, Erodes easily, Percs slowly	Slope, Erodes easily, Percs slowly
Wayden-----	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, Percs slowly, Depth to rock	Slope, Depth to rock, Erodes easily	Slope, Erodes easily, Depth to rock

Water Management--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
723F:							
Zahill-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, Peres slowly, Rooting depth	Slope, Erodes easily, Peres slowly	Slope, Erodes easily, Rooting depth
Cabba-----	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, Depth to rock, Erodes easily	Slope, Depth to rock, Erodes easily	Slope, Erodes easily, Depth to rock
731F:							
Yetull-----	Severe: seepage, slope	Severe: seepage, piping	Severe: no water	Deep to water	Slope, Droughty, Fast intake	Slope, Too sandy, Soil blowing	Too arid, Slope, Droughty
Dune land-----							
741B:							
Shambo-----	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Favorable	Erodes easily	Erodes easily
Straw-----	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Flooding	Favorable	Favorable
745F:							
Shambo-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope	Slope, Erodes easily	Slope, Erodes easily
Amor-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, Depth to rock	Slope, Depth to rock	Slope, Depth to rock
Cabba-----	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, Depth to rock, Erodes easily	Slope, Depth to rock, Erodes easily	Slope, Erodes easily, Depth to rock
761C:							
Hedoes-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Slope	Favorable	Favorable
Belain-----	Moderate: seepage, depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, Depth to rock	Depth to rock	Depth to rock
761E:							
Hedoes-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope	Slope	Slope
Belain-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, Depth to rock	Slope, Depth to rock	Slope, Depth to rock
793B:							
Yamacall-----	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Favorable	Erodes easily	Too arid, Erodes easily
793C:							
Yamacall-----	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Slope	Erodes easily	Too arid, Erodes easily

Water Management--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
795C:							
Yamacall-----	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Slope	Erodes easily	Too arid, Erodes easily
Benz-----	Moderate: slope	Severe: piping	Severe: no water	Deep to water	Slope, Droughty, Percs slowly	Erodes easily, Percs slowly	Too arid, Excess salt, Erodes easily
795D:							
Yamacall-----	Severe: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope	Slope, Erodes easily	Too arid, Slope, Erodes easily
Benz-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, Droughty, Percs slowly	Slope, Erodes easily, Percs slowly	Too arid, Slope, Excess salt
801B:							
Williams-----	Slight	Severe: piping	Severe: no water	Deep to water	Percs slowly, Erodes easily	Erodes easily, Percs slowly	Erodes easily, Percs slowly
Vida-----	Slight	Moderate: piping	Severe: no water	Deep to water	Percs slowly, Erodes easily	Erodes easily, Percs slowly	Erodes easily, Percs slowly
801C:							
Williams-----	Moderate: slope	Severe: piping	Severe: no water	Deep to water	Slope, Percs slowly, Erodes easily	Erodes easily, Percs slowly	Erodes easily, Percs slowly
Vida-----	Moderate: slope	Moderate: piping	Severe: no water	Deep to water	Slope, Percs slowly, Erodes easily	Erodes easily, Percs slowly	Erodes easily, Percs slowly
828A:							
Savage-----	Slight	Moderate: piping	Severe: no water	Deep to water	Percs slowly, Erodes easily	Erodes easily, Percs slowly	Erodes easily, Percs slowly
842A:							
Savage-----	Slight	Moderate: excess salt	Severe: slow refill	Deep to water	Percs slowly, Erodes easily, Excess salt	Erodes easily, Percs slowly	Erodes easily, Percs slowly
Daglum-----	Slight	Severe: excess sodium	Severe: slow refill	Deep to water	Percs slowly, Erodes easily, Excess sodium	Erodes easily, Percs slowly	Excess sodium, Erodes easily, Percs slowly
863E:							
Work-----	Severe: slope	Moderate: thin layer, piping	Severe: no water	Deep to water	Slope	Slope	Slope
Roy-----	Severe: slope	Severe: piping, large stones	Severe: no water	Deep to water	Slope, Large stones, Droughty	Slope, Large stones	Large stones, Slope, Droughty
871B:							
Tamaneen-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Favorable	Large stones	Large stones

Water Management--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
871C:							
Tamaneen-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Slope	Large stones	Large stones
883F:							
Perma-----	Severe: seepage, slope	Severe: seepage, large stones	Severe: no water	Deep to water	Slope, Large stones, Droughty	Slope, Large stones, Too sandy	Large stones, Slope, Droughty
Whitlash-----	Severe: depth to rock, slope	Severe: large stones	Severe: no water	Deep to water	Slope, Large stones, Droughty	Slope, Large stones, Depth to rock	Large stones, Slope, Droughty
892F:							
Whitlash-----	Severe: depth to rock, slope	Severe: large stones	Severe: no water	Deep to water	Slope, Large stones, Droughty	Slope, Large stones, Depth to rock	Large stones, Slope, Droughty
Belain-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, Depth to rock	Slope, Depth to rock	Slope, Depth to rock
Rock outcrop----							
895F:							
Belain-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, Depth to rock	Slope, Depth to rock	Slope, Depth to rock
Whitlash-----	Severe: depth to rock, slope	Severe: seepage	Severe: no water	Deep to water	Slope, Large stones, Droughty	Slope, Large stones, Depth to rock	Large stones, Slope, Droughty
Hedoes-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope	Slope	Slope
896E:							
Belain-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, Depth to rock	Slope, Depth to rock	Slope, Depth to rock
Whitlash-----	Severe: depth to rock, slope	Severe: seepage	Severe: no water	Deep to water	Slope, Large stones, Droughty	Slope, Large stones, Depth to rock	Large stones, Slope, Droughty
Rock outcrop----							
911F:							
Belain-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, Depth to rock	Slope, Depth to rock	Slope, Depth to rock
Whitlash-----	Severe: depth to rock, slope	Severe: seepage	Severe: no water	Deep to water	Slope, Large stones, Droughty	Slope, Large stones, Depth to rock	Large stones, Slope, Droughty
Hedoes-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope	Slope	Slope

Water Management--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
916C:							
Belain-----	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Slope, Soil blowing, Depth to rock	Depth to rock, Soil blowing	Depth to rock
Hedoes-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Slope, Soil blowing	Soil blowing	Favorable
925F:							
Sunburst-----	Severe: slope	Slight	Severe: no water	Deep to water	Slope, Peres slowly, Erodes easily	Slope, Erodes easily, Peres slowly	Too arid, Slope, Erodes easily
Lambeth-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, Erodes easily	Slope, Erodes easily	Too arid, Slope, Erodes easily
941D:							
Busby-----	Severe: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, Soil blowing	Slope, Too sandy, Soil blowing	Too arid, Slope
Twilight-----	Severe: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, Soil blowing, Depth to rock	Slope, Depth to rock, Soil blowing	Too arid, Slope, Depth to rock
943C:							
Tally-----	Severe: seepage	Severe: seepage, piping	Severe: no water	Deep to water	Slope, Soil blowing	Soil blowing	Favorable
943E:							
Tally-----	Severe: seepage, slope	Severe: seepage, piping	Severe: no water	Deep to water	Slope, Soil blowing	Slope, Soil blowing	Slope
Vebar-----	Severe: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, Soil blowing, Depth to rock	Slope, Depth to rock, Soil blowing	Slope, Depth to rock
943F:							
Tally-----	Severe: seepage, slope	Severe: seepage, piping	Severe: no water	Deep to water	Slope, Soil blowing	Slope, Soil blowing	Slope
Cohagen-----	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, Droughty, Soil blowing	Slope, Depth to rock, Soil blowing	Slope, Droughty, Depth to rock
965F:							
Cabba-----	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, Depth to rock, Erodes easily	Slope, Depth to rock, Erodes easily	Slope, Erodes easily, Depth to rock
Macar-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, Erodes easily	Slope, Erodes easily	Slope, Erodes easily
971F:							
Neldore-----	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, Slow intake, Peres slowly	Slope, Depth to rock, Peres slowly	Too arid, Slope, Depth to rock

Water Management--Continued

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
971F: (cont.)							
Bascovy-----	Severe: slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, Slow intake, Peres slowly	Slope, Depth to rock, Erodes easily	Slope, Erodes easily, Depth to rock
972F:							
Neldore-----	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, Slow intake, Peres slowly	Slope, Depth to rock, Peres slowly	Too arid, Slope, Depth to rock
Rock outcrop----							
974F:							
Neldore-----	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, Slow intake, Peres slowly	Slope, Depth to rock, Peres slowly	Too arid, Slope, Depth to rock
Hillon-----	Severe: slope	Moderate: piping	Severe: no water	Deep to water	Slope, Peres slowly, Erodes easily	Slope, Erodes easily, Peres slowly	Too arid, Slope, Erodes easily

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features listed in tables are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

The table "Engineering Index Properties" gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given in the series descriptions in Part I of this survey.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less

than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the "Glossary."

Classification of the soils is determined according to the system adopted by the Unified soil classification system (ASTM, 1993) and the American Association of State Highway and Transportation Officials (AASHTO, 1986).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and plasticity index (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

The tables "Physical Properties of the Soils" and "Chemical Properties of the Soils" show estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given in the series descriptions in Part I of this survey.

Clay as a soil separate, or component, consists of mineral soil particles that are less than 0.002 millimeter in diameter. The estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Moist bulk density is the weight of soil (oven-dry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In the table "Physical Properties of the Soils," the estimated moist bulk

density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6

percent. *Very high*, more than 9 percent, is sometimes used.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In the table "Physical Properties of Soils," the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, very fine sand, sand, and organic matter (as much as 4 percent) and on soil structure and permeability. The estimates are modified by the presence of rock fragments. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion.

Erosion factor K_f indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor is an estimate of the maximum average rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility of soil to soil blowing. Soils are grouped according to the following distinctions:

1. Coarse sands, sands, fine sands, and very fine sands. These soils generally are not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric soil material. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

- 4L. Calcareous loams, silt loams, clay loams, and silty clay loams that have more than 5 percent finely divided calcium carbonate. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils have less than 5 percent finely divided calcium carbonate. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils have less than 5 percent finely divided calcium carbonate. These soils are moderately erodible. Crops can be grown if ordinary measures to control soil blowing are used.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils have less than 5 percent finely divided calcium carbonate. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

8. Soils that are not subject to soil blowing because of coarse fragments on the surface or because of surface wetness.

Cation-exchange capacity is the total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. Soils having a high cation-exchange capacity can retain cations. The ability to retain cations helps to prevent the pollution of ground water.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Calcium carbonate equivalent is the percent of carbonates, by weight, in the soil. The availability of plant nutrients is influenced by the amount of carbonates in the soil. Incorporating nitrogen fertilizer into calcareous soils helps to prevent nitrite accumulation and ammonium-N volatilization.

Gypsum is given as the percent, by weight, of hydrated calcium sulfates in the soil. Gypsum is partially soluble in water and can be dissolved and

removed by water. Soils that have a high content of gypsum (more than 10 percent) may collapse if the gypsum is removed by percolating water.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of the soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Sodium adsorption ratio is the measure of sodium relative to calcium and magnesium in the water extract from saturated soil paste. Soils having a sodium adsorption ratio of 13 or more may be characterized by an increased dispersion of organic matter and clay particles, reduced permeability and aeration, and a general degradation of soil structure.

Water Features

The table "Water Features" gives estimates of several important water features used in land use planning that involves engineering considerations. These features are described in the following paragraphs.

Hydrologic soil groups are groups of soils that, when saturated, have the same runoff potential under similar storm and ground cover conditions. The soil properties that affect the runoff potential are those that influence the minimum rate of infiltration in a bare soil after prolonged wetting and when the soil is not frozen. These properties include the depth to a seasonal high water table, the intake rate, permeability after prolonged wetting, and the depth to a very slowly permeable layer. The influences of ground cover and slope are treated independently and are not taken into account in hydrologic soil groups.

In the definitions of the hydrologic soil groups, the infiltration rate is the rate at which water enters the soil at the surface and is controlled by surface conditions. The transmission rate is the rate at which water moves through the soil and is controlled by properties of the soil layers.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist chiefly of very deep, well drained to excessively

drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well or well drained soils that have a moderately fine to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils that have a moderately fine or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clayey soils that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflow from streams or by runoff from adjacent slopes. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in marshes and swamps or in closed depressions is considered to be ponding.

The table "Water Features" gives the frequency and duration of flooding and the time of year when flooding is most likely to occur. Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as none, rare, occasional, or frequent. *None* means flooding is not probable; *rare* that it is unlikely but is possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs often under normal weather conditions (the chance of flooding is 50 percent in any year). The term *common* includes both frequent and occasional flooding.

Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 to 30 days), and *very long* (more than 30 days). The time of year that flooding is most likely to occur is expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in

organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and level of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is a zone of saturation at the highest average depth during the wettest season. It is at least 6 inches thick, persists in the soil for more than a few weeks, and is within 6 feet of the surface. Indicated in the table "Water Features" are the depth to the seasonal high water table, the kind of water table, and the months of the year when the water table usually is highest.

An *apparent* water table is indicated by the level at which water stands in a freshly dug, unlined borehole after adequate time for adjustments in the surrounding soil.

A *perched* water table is one that is above an unsaturated zone in the soil. The basis for determining that a water table is perched may be general knowledge of the area. The water table is proven to be perched if the water level in a borehole is observed to fall when the borehole is extended.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation.

Soil Features

The table "Soil Features" gives estimates of several important soil features used in land use planning that involves engineering considerations. These features are described in the following paragraphs.

Depth to bedrock is given if bedrock is within a depth of 60 inches. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with

trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

A *low* potential for frost action indicates that the soil is rarely susceptible to the formation of ice lenses; a *moderate* potential indicates that the soil is susceptible to formation of ice lenses, resulting in frost heave and the subsequent loss of soil strength; and a *high* potential indicates that the soil is highly susceptible to formation of ice lenses, resulting in frost heave and the subsequent loss of soil strength.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil.

Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Engineering Index Properties

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
2: Riverwash-----												
2B: Marcott-----	0-4	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	90-95	35-45	15-20
	4-15	Silty clay, silty clay loam	CL, CH	A-6, A-7	0	0	100	100	95-100	85-95	35-55	15-30
	15-30	Silty clay, silty clay loam, clay loam	CL, CH	A-6, A-7	0	0	100	100	90-100	75-95	35-55	15-30
	30-60	Silty clay loam, clay loam, silty clay	CL, CH	A-6, A-7	0	0	90-100	85-100	75-100	65-95	35-55	15-30
Big sandy-----	0-3	Loam	CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	3-11	Stratified fine sandy loam to silty clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	80-100	50-90	25-40	5-15
	11-32	Stratified fine sandy loam to silty clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	80-100	50-90	25-40	5-15
	32-60	Stratified fine sand to clay	CL-ML, CL	A-4, A-6	0	0	100	100	75-95	50-85	25-40	5-15
12C: Beaverton-----	0-4	Very cobbly loam	GM, SM	A-2, A-4, A-1	0	30-45	60-75	55-70	40-60	20-40	20-25	NP-5
	4-15	Very cobbly clay loam, very cobbly sandy clay loam, very gravelly clay loam	GC, SC, GM- GC, SC- SM	A-2, A-4, A-6	0	20-40	45-70	40-60	35-55	20-40	25-35	5-15
	15-60	Extremely cobbly loamy sand, extremely gravelly sand, very cobbly loamy sand	GM, SM, SP- SM, GP- GM	A-1	0	25-50	30-75	20-65	10-50	5-15	---	NP
Beaverton-----	0-5	Gravelly loam	CL-ML, SC-SM, GM-GC	A-4, A-2	0	0-10	65-80	60-75	50-70	30-60	25-30	5-10
	5-18	Very gravelly clay loam, very gravelly sandy clay loam	GM-GC, GC	A-4, A-2, A-6	0	0-25	40-55	35-50	30-45	20-40	25-35	5-15
	18-60	Extremely gravelly loamy sand, extremely gravelly sand, very gravelly loamy sand	GM, GP, GP- GM, SM	A-1	0	0-30	25-60	15-50	10-35	0-15	---	NP

[illegible]

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
22F: Hillon-----	0-4	Loam	ML, CL, CL- ML	A-4, A-6	0	0-5	85-100	80-100	80-90	65-75	20-35	NP-15
	4-60	Loam, clay loam	CL	A-6	0	0-5	85-100	80-100	80-90	65-80	25-35	10-20
27B: Attewan-----	0-5	Loam	ML, CL- ML	A-4	0	0-5	85-100	80-100	70-90	55-75	20-30	NP-10
	5-17	Clay loam, loam, gravelly loam	CL, SC	A-6	0	0-5	75-100	70-100	55-85	35-70	30-40	10-20
	17-27	Clay loam, gravelly loam, loam	CL, SC, GC	A-6	0	0-5	70-100	65-100	50-85	35-65	30-40	10-20
	27-60	Very gravelly loamy sand, extremely gravelly loamy sand, very gravelly sand	GP, GP- GM, GM, SM	A-1	0	0-15	25-55	15-50	5-20	0-15	---	NP
28: Nishon-----	0-8	Clay loam	CL	A-6, A-7	0	0	100	100	85-100	60-85	30-45	10-20
	8-31	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-95	40-65	20-45
	31-60	Clay, silty clay, clay loam	CL, CH	A-6, A-7	0	0	90-100	90-100	80-100	65-90	35-60	15-40
30B: Marvan-----	0-3	Clay	CL, CH	A-7	0	0	100	100	90-100	75-95	40-70	25-50
	3-46	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-100	45-70	25-50
	46-60	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-100	45-70	25-50
30C: Marvan-----	0-3	Clay	CL, CH	A-7	0	0	100	100	90-100	75-95	40-70	25-50
	3-46	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-100	45-70	25-50
	46-60	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-100	45-70	25-50
31A: Ferd-----	0-3	Loam	CL-ML, CL	A-4	0	0	100	95-100	80-95	55-75	25-30	5-10
	3-8	Loam, clay loam, silty clay loam	CL, CL- ML	A-4, A-6	0	0	100	95-100	85-95	70-90	25-40	5-15
	8-13	Clay loam, silty clay loam, clay	CL	A-6, A-7	0	0	100	95-100	85-100	70-90	35-50	15-30
	13-32	Clay loam, silty clay loam	CL	A-6	0	0	100	95-100	85-100	70-90	30-40	10-20
	32-60	Clay loam, silty clay loam	CL	A-6	0	0	100	95-100	85-100	70-90	30-40	10-20

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index		
			Unified	AASHTO	>10 inches	3-10 inches								
							4	10	40	200				
	In				Pct	Pct					Pct			
32B: Kobase-----	0-6	Silty clay loam	CL	A-7,	0	0	95-100	90-100	85-100	80-95	30-45	10-20		
				A-6										
	6-25	Silty clay loam, silty clay, clay	CL	A-7,	0	0	95-100	90-100	85-100	75-95	35-50	15-25		
				A-6										
	25-60	Silty clay loam, silty clay, clay	CL	A-7,	0	0	95-100	90-100	85-100	75-95	35-50	15-25		
				A-6										
32C: Kobase-----	0-6	Silty clay loam	CL	A-7,	0	0	95-100	90-100	85-100	80-95	30-45	10-20		
				A-6										
	6-25	Silty clay loam, silty clay, clay	CL	A-7,	0	0	95-100	90-100	85-100	75-95	35-50	15-25		
				A-6										
	25-60	Silty clay loam, silty clay, clay	CL	A-7,	0	0	95-100	90-100	85-100	75-95	35-50	15-25		
				A-6										
32D: Kobase-----	0-6	Silty clay loam	CL	A-7,	0	0	95-100	90-100	85-100	80-95	30-45	10-20		
				A-6										
	6-25	Silty clay loam, silty clay, clay	CL	A-7,	0	0	95-100	90-100	85-100	75-95	35-50	15-25		
				A-6										
	25-60	Silty clay loam, silty clay, clay	CL	A-7,	0	0	95-100	90-100	85-100	75-95	35-50	15-25		
				A-6										
33A: Phillips-----	0-8	Loam	CL-ML	A-4	0	0-5	85-100	80-100	75-100	55-80	20-30	5-10		
	8-15	Clay, clay loam	CL	A-6,	0	0-5	85-100	80-100	70-95	60-85	35-50	15-25		
				A-7										
	15-32	Clay loam, loam	CL	A-6,	0	0-5	85-100	80-100	75-100	55-80	30-45	10-20		
				A-7										
	32-60	Clay loam, loam	CL, CL- ML	A-6,	0	0-5	85-100	80-100	70-90	55-75	25-40	5-15		
				A-4										
34A: Linnet-----	0-7	Silty clay	CL	A-7	0	0	90-100	85-100	80-100	75-95	40-50	15-25		
	7-14	Silty clay, clay	CL, CH	A-7	0	0	90-100	85-100	75-100	60-90	45-65	25-45		
	14-36	Silty clay, clay, silty clay loam	CL, CH	A-6, A-7	0	0-5	85-100	80-100	70-100	55-90	35-55	15-35		
	36-60	Clay loam, silty clay loam, silty clay	CL, CH	A-6, A-7	0	0-5	85-100	80-100	65-95	50-85	35-55	15-35		
35B: Assinniboine----	0-6	Fine sandy loam	SM	A-4,	0	0	85-100	75-100	55-80	25-45	15-25	NP-5		
				A-2										
	6-16	Sandy clay loam, fine sandy loam	SC-SM, SC	A-4, A-6, A-2	0	0	80-100	75-100	65-95	40-65	25-35	5-15		
	16-48	Fine sandy loam, sandy loam, sandy clay loam	SM, SC- SM	A-4, A-2	0	0	85-100	75-100	60-85	35-60	15-30	NP-10		

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
35B: (cont.) Assinniboine----- (cont.)	48-60	Stratified fine sandy loam to fine sand	SM	A-4, A-2	0	0	85-100	75-100	55-80	10-40	---	NP
36B: Chinook-----	0-5	Fine sandy loam	SM	A-4, A-2	0	0	80-100	75-100	65-85	30-50	15-25	NP-5
	5-24	Fine sandy loam, sandy loam	SM	A-4, A-2	0	0	80-100	75-100	55-85	30-50	15-25	NP-5
	24-60	Fine sandy loam, loamy fine sand, sandy loam	SM	A-4, A-2	0	0	80-100	75-100	60-80	25-45	15-25	NP-5
36C: Chinook-----	0-5	Fine sandy loam	SM	A-4, A-2	0	0	80-100	75-100	65-85	30-50	15-25	NP-5
	5-24	Fine sandy loam, sandy loam	SM	A-4, A-2	0	0	80-100	75-100	55-85	30-50	15-25	NP-5
	24-60	Fine sandy loam, loamy fine sand, sandy loam	SM	A-4, A-2	0	0	80-100	75-100	60-80	25-45	15-25	NP-5
37B: Evanston-----	0-6	Loam	CL, CL- ML	A-4, A-6	0	0-5	95-100	95-100	85-90	65-70	25-35	5-15
	6-14	Clay loam, loam	CL	A-6	0	0-5	95-100	95-100	85-100	65-85	25-35	10-15
	14-25	Clay loam, loam, silty clay loam	CL	A-6	0	0-5	95-100	95-100	85-100	65-85	25-35	10-15
	25-60	Loam, clay loam, fine sandy loam	CL	A-6	0	0-5	95-100	95-100	70-90	50-75	25-35	10-15
37C: Evanston-----	0-6	Loam	CL, CL- ML	A-4, A-6	0	0-5	95-100	95-100	85-90	65-70	25-35	5-15
	6-14	Clay loam, loam	CL	A-6	0	0-5	95-100	95-100	85-100	65-85	25-35	10-15
	14-25	Clay loam, loam, silty clay loam	CL	A-6	0	0-5	95-100	95-100	85-100	65-85	25-35	10-15
	25-60	Loam, clay loam, fine sandy loam	CL	A-6	0	0-5	95-100	95-100	70-90	50-75	25-35	10-15
38B: Ethridge-----	0-6	Silty clay loam	CL	A-6, A-7	0	0	100	95-100	90-100	85-95	25-45	10-20
	6-14	Silty clay, silty clay loam, clay	CL	A-7	0	0	100	95-100	95-100	90-95	40-50	20-30
	14-32	Clay loam, silty clay loam, clay	CL	A-6, A-7	0	0	100	95-100	90-100	85-95	35-50	15-30

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
38B: (cont.)												
Ethridge (cont.)	32-60	Silty clay loam, clay loam, silt loam	CL	A-6, A-7	0	0	100	95-100	90-100	85-95	30-50	10-25
39B:												
Assinniboine	0-6	Loam	CL-ML	A-4	0	0	80-100	75-100	65-95	45-75	20-30	5-10
	6-17	Sandy clay loam, fine sandy loam	SC-SM, SC	A-4, A-6, A-2	0	0	80-100	75-100	60-90	25-50	25-35	5-15
	17-45	Fine sandy loam, sandy loam	SM, SC- SM	A-4, A-2	0	0	85-100	75-100	60-85	30-50	20-25	NP-10
	45-60	Stratified fine sandy loam to fine sand	SM	A-4, A-2	0	0	85-100	75-100	55-80	15-40	---	NP-5
43A:												
Pendroy	0-5	Clay	CH	A-7	0	0	100	100	90-100	75-95	60-85	40-60
	5-44	Clay	CH	A-7	0	0	100	100	90-100	75-95	60-85	40-60
	44-60	Silty clay, clay	CH	A-7	0	0	100	100	95-100	80-95	50-75	30-55
44B:												
Kevin	0-6	Clay loam	CL	A-6	0	0-5	90-100	85-100	80-95	70-80	25-40	10-20
	6-9	Clay loam, clay	CL	A-6, A-7	0	0-5	90-100	85-100	80-95	70-80	35-50	15-25
	9-31	Clay loam	CL	A-6	0	0-5	90-100	85-100	80-95	70-80	30-40	10-20
	31-60	Clay loam	CL	A-6	0	0-5	90-100	85-100	80-95	70-80	30-40	10-20
47B:												
Marias	0-6	Silty clay	CL, CH	A-7	0	0	100	100	95-100	90-95	40-60	20-40
	6-38	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-95	40-70	25-50
	38-60	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-95	40-70	25-50
47C:												
Marias	0-6	Silty clay	CL, CH	A-7	0	0	100	100	95-100	90-95	40-60	20-40
	6-38	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-95	40-70	25-50
	38-60	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-95	40-70	25-50
48A:												
Vanda	0-7	Clay	CL, CH	A-7	0	0	100	100	95-100	75-95	40-65	20-45
	7-60	Clay, silty clay, silty clay loam	CL, CH	A-7, A-6	0	0	100	100	95-100	80-95	35-65	15-45
48C:												
Vanda	0-7	Clay	CL, CH	A-7	0	0	100	100	95-100	75-95	40-65	20-45
	7-60	Clay, silty clay, silty clay loam	CL, CH	A-7, A-6	0	0	100	100	95-100	80-95	35-65	15-45

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10						
					inches	inches	4	10	40	200		
	In				Pct	Pct					Pct	
50A:												
Telstad-----	0-5	Loam	CL-ML	A-4	0	0-5	85-100	80-100	65-90	50-70	25-30	5-10
	5-14	Clay loam, loam	CL	A-6	0	0-5	95-100	90-100	80-95	60-80	30-40	10-20
	14-38	Clay loam, loam	CL-ML	A-6,	0	0-5	95-100	90-100	80-95	60-80	25-35	5-15
			CL	A-4								
	38-60	Loam, clay loam	CL-ML,	A-6,	0	0-5	95-100	90-100	75-90	55-75	25-35	5-15
			CL	A-4								
55B:												
Liheh-----	0-12	Loamy fine sand	SM	A-2,	0	0	100	85-100	45-75	15-30	---	NP
				A-1								
	12-60	Loamy fine	SM	A-2,	0	0	100	85-100	45-75	15-35	---	NP
		sand, loamy		A-1								
		sand, sand										
56A:												
Scobey-----	0-6	Clay loam	CL	A-6	0	0-5	85-100	75-95	70-90	65-80	25-40	10-20
	6-15	Clay, clay loam	CL	A-7,	0	0-5	85-100	85-95	80-95	65-90	35-50	15-30
				A-6								
	15-60	Clay loam	CL	A-6,	0	0-5	85-100	75-95	70-90	65-80	35-45	15-25
				A-7								
57B:												
Absarokee-----	0-7	Clay loam	CL-ML,	A-4,	0	0-5	95-100	90-100	70-95	70-90	25-40	5-15
			CL	A-6								
	7-18	Clay, clay loam	CL, CH	A-7,	0	0-5	95-100	90-100	75-100	70-90	35-55	15-30
				A-6								
	18-34	Clay loam,	CL,	A-6,	0	0-10	60-100	55-95	40-80	35-75	30-45	10-20
		channery clay	GC, SC	A-7								
		loam										
	34-60	Unweathered	---	---	---	---	---	---	---	---	---	---
		bedrock										
57C:												
Absarokee-----	0-7	Clay loam	CL-ML,	A-4,	0	0-5	95-100	90-100	70-95	70-90	25-40	5-15
			CL	A-6								
	7-18	Clay, clay loam	CL, CH	A-7,	0	0-5	95-100	90-100	75-100	70-90	35-55	15-30
				A-6								
	18-34	Clay loam,	CL,	A-6,	0	0-10	60-100	55-95	40-80	35-75	30-45	10-20
		channery clay	GC, SC	A-7								
		loam										
	34-60	Unweathered	---	---	---	---	---	---	---	---	---	---
		bedrock										
57E:												
Absarokee-----	0-7	Clay loam	CL-ML,	A-4,	0	0-5	95-100	90-100	70-95	70-90	25-40	5-15
			CL	A-6								
	7-18	Clay, clay loam	CL, CH	A-7,	0	0-5	95-100	90-100	75-100	70-90	35-55	15-30
				A-6								
	18-34	Clay loam,	CL,	A-6,	0	0-10	60-100					

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4 10 40 200					
	In				Pct	Pct					Pct	
57E: (cont.)												
Reeder-----	0-7	Loam	CL-ML	A-4	0	0	90-100	85-100	70-95	55-80	25-30	5-10
	7-12	Clay loam, sandy clay loam, loam	CL-ML, CL	A-4, A-6	0	0	90-100	85-100	70-95	50-75	25-40	5-15
	12-34	Loam, sandy loam, clay loam	CL-ML, SC-SM	A-4	0	0-5	85-100	80-100	65-90	45-65	25-30	5-10
	34-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
58B:												
Lonna-----	0-6	Silty clay loam	CL	A-6	0	0	100	100	95-100	85-95	30-35	10-15
	6-11	Silt loam, silty clay loam	CL-ML, CL	A-6, A-4	0	0	100	100	95-100	75-95	25-40	5-15
	11-34	Silt loam, silty clay loam	CL-ML, CL	A-6, A-4	0	0	100	100	95-100	75-95	25-40	5-15
	34-60	Silty clay loam, silt loam, very fine sandy loam	CL-ML, CL	A-6, A-4	0	0	100	100	95-100	75-90	25-35	5-15
58C:												
Lonna-----	0-6	Silty clay loam	CL	A-6	0	0	100	100	95-100	85-95	30-35	10-15
	6-11	Silt loam, silty clay loam	CL-ML, CL	A-6, A-4	0	0	100	100	95-100	75-95	25-40	5-15
	11-34	Silt loam, silty clay loam	CL-ML, CL	A-6, A-4	0	0	100	100	95-100	75-95	25-40	5-15
	34-60	Silty clay loam, silt loam, very fine sandy loam	CL-ML, CL	A-6, A-4	0	0	100	100	95-100	75-90	25-35	5-15
60A:												
Havre-----	0-6	Loam	CL-ML	A-4	0	0	100	100	80-95	60-90	20-30	5-10
	6-60	Stratified fine sandy loam to silty clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	80-95	60-80	20-35	5-15
63:												
Lardell-----	0-4	Silty clay	CH, CL	A-7	0	0	100	100	95-100	90-95	40-60	20-40
	4-38	Silty clay loam, clay loam, silty clay	CL, CH	A-6, A-7	0	0	100	100	90-100	75-90	30-40	10-20
	38-60	Stratified fine sandy loam to silty clay	CL	A-6	0	0	100	100	80-90	65-85	25-40	10-20
67B:												
Bearpaw-----	0-6	Clay loam	CL	A-6, A-7	0	0-5	85-100	80-100	70-100	55-80	30-45	10-20
	6-16	Clay loam, clay	CL, CH	A-7	0	0-5	85-100	80-100	70-100	60-90	40-65	15-40
	16-34	Clay loam, clay	CL, CH	A-6, A-7	0	0-5	85-100	80-100	70-100	55-85	35-60	15-35
	34-60	Clay loam, clay	CL, CH	A-6, A-7	0	0-5	85-100	80-100	70-100	55-85	35-60	15-35

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4 10 40 200					
	In				Pct	Pct					Pct	
67C:												
Bearpaw-----	0-6	Clay loam	CL	A-6, A-7	0	0-5	85-100	80-100	70-100	55-80	30-45	10-20
	6-16	Clay loam, clay	CL, CH	A-7	0	0-5	85-100	80-100	70-100	60-90	40-65	15-40
	16-34	Clay loam, clay	CL, CH	A-6, A-7	0	0-5	85-100	80-100	70-100	55-85	35-60	15-35
	34-60	Clay loam, clay	CL, CH	A-6, A-7	0	0-5	85-100	80-100	70-100	55-85	35-60	15-35
68B:												
Gerber-----	0-7	Silty clay	CL, CH	A-7	0	0	100	95-100	90-100	80-95	40-55	15-30
	7-16	Silty clay, clay	CL, CH	A-7	0	0	100	95-100	85-100	75-95	40-65	20-45
	16-46	Silty clay, silty clay loam, clay loam	CL, CH	A-7, A-6	0	0	95-100	90-100	85-100	75-95	35-55	15-35
	46-60	Clay loam, silty clay, clay	CL, CH	A-7, A-6	0	0	95-100	90-100	80-100	65-95	35-55	15-35
69C:												
Vida-----	0-5	Clay loam	CL	A-6	0	0-10	90-100	85-100	75-95	60-80	25-35	10-15
	5-15	Clay loam, loam	CL	A-6	0	0-10	90-100	85-100	70-95	50-85	30-40	10-20
	15-60	Clay loam, loam	CL	A-6	0	0-10	90-100	85-100	70-95	50-80	25-40	10-20
Zahill-----	0-3	Clay loam	CL, CL- ML	A-6, A-4	0	0-10	90-100	85-100	85-95	70-80	25-40	5-15
	3-18	Clay loam, loam	CL, CL- ML	A-4, A-6	0	0-10	90-100	85-100	80-95	60-80	25-40	5-15
	18-60	Clay loam, loam	CL, CL- ML	A-4, A-6	0	0-10	90-100	85-100	80-95	60-80	25-40	5-15
71D:												
Roy-----	0-7	Very cobbly clay loam	GC	A-2, A-6, A-7	0	30-45	45-75	40-70	35-60	30-50	30-45	10-20
	7-15	Very stony clay loam, extremely stony clay, very cobbly clay loam	GC, CL, SC	A-6, A-7, A-2	0	30-65	40-80	30-70	25-65	20-55	30-50	15-30
	15-60	Extremely cobbly sandy clay loam, extremely stony clay loam, very cobbly sandy clay loam	GC, SC	A-6, A-2	0	30-65	40-80	30-70	25-65	20-50	25-40	10-20
72F:												
Zahill-----	0-3	Clay loam	CL, CL- ML	A-6, A-4	0	0-10	90-100	85-100	85-95	70-80	25-40	5-15
	3-18	Clay loam, loam	CL, CL- ML	A-4, A-6	0	0-10	90-100	85-100	80-95	60-80	25-40	5-15
	18-60	Clay loam, loam	CL, CL- ML	A-4, A-6	0	0-10	90-100	85-100	80-95	60-80	25-40	5-15

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	sieve number--					
							4	10	40	200		
	In				Pct	Pct					Pct	
73B:												
Yetull-----	0-5	Loamy fine sand	SM	A-2	0	0-5	95-100	95-100	50-75	10-30	---	NP
	5-60	Loamy sand, fine sand, loamy fine sand	SM, SP- SM SM	A-1, A-3, A-2	0	0-5	95-100	95-100	45-70	5-30	---	NP
Lonesome-----	0-6	Loamy fine sand	SM	A-2	0	0-2	95-100	95-100	80-90	25-35	15-20	NP-5
	6-32	Loamy fine sand, loamy sand, fine sand	SM SM SM	A-2 A-2 A-2	0	0-2	95-100	95-100	50-90	15-35	15-20	NP-5
	32-60	Clay loam, loam, silty clay loam	CL, CL- ML ML	A-4, A-6 A-6	0	0-5	95-100	95-100	85-100	60-85	25-35	5-15
74C:												
Shambo-----	0-6	Loam	CL-ML	A-4	0	0	100	100	85-100	65-90	25-30	5-10
	6-15	Loam, clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	85-100	65-90	25-35	5-15
	15-60	Loam, clay loam, silty clay loam	CL-ML, CL CL	A-6, A-4 A-4	0	0	100	100	90-100	65-95	25-35	5-15
75B:												
Farnuf-----	0-6	Loam	ML, CL- ML	A-4 A-4	0	0	80-100	75-100	60-100	55-80	20-30	NP-10
	6-18	Clay loam, loam	CL	A-6	0	0	80-100	75-100	65-95	50-90	25-40	10-20
	18-46	Loam, clay loam	CL, CL- ML	A-6, A-4	0	0	80-100	75-100	65-95	50-80	25-35	5-15
	46-60	Stratified gravelly sandy loam to silty clay loam	CL, SC, CL- ML, SC- SM	A-6, A-4 A-4 A-4	0	0-15	75-90	65-85	50-80	45-60	20-30	5-15
75C:												
Farnuf-----	0-6	Loam	ML, CL- ML	A-4 A-4	0	0	80-100	75-100	60-100	55-80	20-30	NP-10
	6-18	Loam, clay loam	CL	A-6	0	0	80-100	75-100	65-95	50-90	25-40	10-20
	18-46	Loam, clay loam	CL, CL- ML	A-6, A-4	0	0	80-100	75-100	65-95	50-80	25-35	5-15
	46-60	Stratified gravelly sandy loam to silty clay loam	CL, SC, CL- ML, SC- SM	A-6, A-4 A-4 A-4	0	0-15	75-90	65-85	50-80	45-60	20-30	5-15
76C:												
Hedoes-----	0-5	Loam	ML, SM	A-4	0	0-15	85-100	75-100	65-95	45-75	25-35	NP-5
	5-20	Loam, sandy loam	ML, SM SM	A-4 A-4	0	0-15	90-100	85-100	65-95	45-75	25-35	NP-5
	20-31	Coarse sandy loam, gravelly sandy loam, sandy loam	SM SM SM	A-1, A-2 A-2	0	0-15	85-95	30-60	45-60	10-25	---	NP
	31-60	Very gravelly coarse sandy loam, gravelly sandy loam	GM, SM SM SM SM	A-1 A-1 A-1 A-1	0	0-15	45-65	30-55	15-35	10-20	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4 10 40 200					
	In				Pct	Pct					Pct	
77F:												
Tinsley-----	0-6	Gravelly sandy loam	SM	A-2, A-1	0	0-10	70-90	55-75	35-55	15-35	15-20	NP-5
	6-60	Very gravelly sand, very cobbly loamy sand, extremely gravelly sand	GM, SM, SP- SM, GP- GM	A-1	0	10-40	40-70	25-55	10-35	5-15	---	NP
79B:												
Yamacall-----	0-4	Loam	CL-ML	A-4	0	0-5	85-100	80-100	60-85	55-75	25-30	5-10
	4-12	Loam, clay loam	CL, CL- ML	A-4, A-6	0	0-5	85-100	80-100	65-90	60-80	25-35	5-15
	12-60	Loam, clay loam	CL, CL- ML	A-4, A-6	0	0-5	85-100	80-100	60-85	55-75	25-35	5-15
79C:												
Yamacall-----	0-4	Loam	CL-ML	A-4	0	0-5	85-100	80-100	60-85	55-75	25-30	5-10
	4-12	Loam, clay loam	CL, CL- ML	A-4, A-6	0	0-5	85-100	80-100	65-90	60-80	25-35	5-15
	12-60	Loam, clay loam	CL, CL- ML	A-4, A-6	0	0-5	85-100	80-100	60-85	55-75	25-35	5-15
79D:												
Yamacall-----	0-4	Loam	CL-ML	A-4	0	0-5	85-100	80-100	60-85	55-75	25-30	5-10
	4-12	Loam, clay loam	CL, CL- ML	A-4, A-6	0	0-5	85-100	80-100	65-90	60-80	25-35	5-15
	12-60	Loam, clay loam	CL, CL- ML	A-4, A-6	0	0-5	85-100	80-100	60-85	55-75	25-35	5-15
81A:												
Glendive-----	0-6	Sandy loam	SM, ML	A-2, A-4	0	0	100	100	65-85	30-55	15-20	NP-5
	6-29	Loam, sandy loam, fine sandy loam	ML, CL- ML, SM, SC- SM	A-4	0	0	100	100	65-95	40-70	15-25	NP-10
	29-60	Stratified loamy sand to clay loam	SM, SC- SM	A-2, A-4	0	0	95-100	75-100	60-90	25-50	15-25	NP-10
82B:												
Savage-----	0-6	Silty clay loam	CL, CL- ML	A-6, A-4	0	0	95-100	95-100	90-100	75-95	25-40	5-15
	6-16	Clay, silty clay, silty clay loam	CL	A-7, A-6	0	0	95-100	95-100	85-100	75-95	35-50	15-30
	16-60	Silty clay, silty clay loam, clay	CL	A-7, A-6	0	0-5	90-100	85-100	75-100	65-95	30-50	10-30
86B:												
Work-----	0-6	Clay loam	CL	A-6	0	0-5	90-100	80-100	70-90	60-80	30-40	10-20
	6-22	Clay, clay loam	CL, CH	A-7, A-6	0	0-5	90-100	80-100	70-95	60-85	30-55	10-30

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
86B: (cont.) Work(cont.) -----	22-48	Clay loam, loam	CL, CL- ML	A-4, A-6, A-7	0	0-5	90-100	80-100	65-90	55-80	25-45	5-20
	48-60	Gravelly clay loam, gravelly loam, clay loam	CL, CL- ML, GC, SC	A-4, A-6, A-7	0	0-10	60-100	55-100	50-95	35-75	25-45	5-20
86C: Work-----	0-6	Clay loam	CL	A-6	0	0-5	90-100	80-100	70-90	60-80	30-40	10-20
	6-22	Clay, clay loam	CL, CH	A-7, A-6	0	0-5	90-100	80-100	70-95	60-85	30-55	10-30
	22-48	Clay loam, loam	CL, CL- ML	A-4, A-6, A-7	0	0-5	90-100	80-100	65-90	55-80	25-45	5-20
	48-60	Gravelly clay loam, gravelly loam, clay loam	CL, CL- ML, GC, SC	A-4, A-6, A-7	0	0-10	60-100	55-100	50-95	35-75	25-45	5-20
86D: Work-----	0-6	Clay loam	CL	A-6	0	0-5	90-100	80-100	70-90	60-80	30-40	10-20
	6-22	Clay, clay loam	CL, CH	A-7, A-6	0	0-5	90-100	80-100	70-95	60-85	30-55	10-30
	22-48	Clay loam, loam	CL, CL- ML	A-4, A-6, A-7	0	0-5	90-100	80-100	65-90	55-80	25-45	5-20
	48-60	Gravelly clay loam, gravelly loam, clay loam	CL, CL- ML, GC, SC	A-4, A-6, A-7	0	0-10	60-100	55-100	50-95	35-75	25-45	5-20
87B: Tamaneen-----	0-5	Clay loam	CL	A-6	0	0-5	85-100	85-100	70-95	65-90	30-40	10-20
	5-14	Silty clay, silty clay loam, clay loam	CL A-7	A-6, A-7	0	0-5	85-100	85-100	75-95	70-90	35-50	15-30
	14-19	Clay loam, silty clay, gravelly silty clay loam	CL A-7	A-6, A-7	0	0-5	75-95	70-90	55-80	50-75	30-50	10-25
	19-29	Very gravelly loam, gravelly clay loam	GM-GC, GC A-6	A-2, A-4, A-6	0	0-15	50-60	45-55	30-50	25-45	25-40	5-15
	29-60	Extremely gravelly sandy loam, extremely gravelly loam	GM, GM- GC, GP- GM	A-1, A-2	0	10-30	25-40	15-30	10-25	5-20	20-30	NP-10
88C: Perma-----	0-10	Gravelly loam	SM, SC- SM, GM, GM- GC	A-4	0	0-15	65-85	60-75	50-65	35-50	20-30	NP-10
	10-38	Very gravelly loam, very cobbly loam, very cobbly sandy loam	GM-GC, GM, SC- SM, SM	A-2, A-4, A-1	0	10-40	50-70	40-60	30-50	20-40	20-30	NP-10

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
88C: (cont.) Perma (cont.) -----	38-60	Extremely gravelly loamy sand, extremely cobbly loam, extremely gravelly sandy loam	GM, GP, GP- GM	A-1	0	15-40	20-40	10-30	5-25	0-15	15-25	NP-5
90A: Harlake-----	0-8	Silty clay	CL, CH	A-7	0	0	100	100	90-100	75-90	40-65	20-40
	8-48	Stratified clay to silty clay loam	CL, CH	A-7	0	0	100	100	95-100	85-95	40-70	15-45
	48-60	Stratified silty clay loam to fine sandy loam	CL, CL- ML	A-6, A-4	0	0	100	100	85-95	60-75	20-40	5-15
92E: Sunburst-----	0-5	Clay loam	CL	A-6	0	0-10	95-100	85-95	85-95	75-85	30-40	10-20
	5-20	Clay, clay loam	CL	A-7, A-6	0	0-10	95-100	85-95	80-90	75-85	35-50	15-30
	20-60	Clay, clay loam	CL	A-7, A-6	0	0-10	95-100	85-95	80-90	75-85	35-50	15-30
Bascovy-----	0-4	Silty clay	CH, CL	A-7	0	0	90-100	75-100	70-95	60-95	40-60	20-35
	4-15	Clay, silty clay	CH	A-7	0	0	90-100	75-100	70-95	60-95	50-70	25-45
	15-29	Clay, silty clay	CH	A-7	0	0	90-100	75-100	70-95	60-95	50-70	25-45
	29-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
93F: Yetull-----	0-8	Fine sandy loam	SM, ML	A-4	0	0-5	95-100	95-100	70-90	35-55	---	NP
	8-60	Fine sand, loamy sand, loamy fine sand	SM, SP- SM	A-1, A-3, A-2	0	0-5	95-100	95-100	45-70	5-30	---	NP
94B: Busby-----	0-4	Fine sandy loam	SM	A-4	0	0	100	100	60-85	35-50	20-25	NP-5
	4-11	Fine sandy loam, sandy loam	SM	A-4	0	0	100	100	60-90	35-75	20-25	NP-5
	11-28	Fine sandy loam, sandy loam	SM	A-4	0	0	100	100	60-85	35-50	20-25	NP-5
	28-60	Loamy sand, fine sandy loam, sandy loam	SM	A-2, A-4	0	0	100	100	60-85	20-50	15-25	NP-5
94C: Busby-----	0-4	Fine sandy loam	SM	A-4	0	0	100	100	60-85	35-50	20-25	NP-5
	4-11	Fine sandy loam, sandy loam	SM	A-4	0	0	100	100	60-90	35-75	20-25	NP-5

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
94C: (cont.) Busby (cont.) ----	11-28	Fine sandy loam, sandy loam	SM	A-4	0	0	100	100	60-85	35-50	20-25	NP-5
	28-60	Loamy sand, fine sandy loam, sandy loam	SM	A-2, A-4	0	0	100	100	60-85	20-50	15-25	NP-5
94D: Busby-----	0-4	Fine sandy loam	SM	A-4	0	0	100	100	60-85	35-50	20-25	NP-5
	4-11	Fine sandy loam, sandy loam	SM	A-4	0	0	100	100	60-90	35-75	20-25	NP-5
	11-28	Fine sandy loam, sandy loam	SM	A-4	0	0	100	100	60-85	35-50	20-25	NP-5
	28-60	Loamy sand, fine sandy loam, sandy loam	SM	A-2, A-4	0	0	100	100	60-85	20-50	15-25	NP-5
96B: Macar-----	0-6	Loam	CL-ML	A-4	0	0	100	100	75-95	55-70	25-30	5-10
	6-15	Clay loam, loam, silty clay loam	CL-ML, CL	A-6, A-4	0	0	100	100	75-95	60-85	25-40	5-15
	15-45	Clay loam, loam, silty clay loam	CL-ML, CL	A-6, A-4	0	0	100	100	75-95	60-85	25-40	5-15
	45-60	Stratified sandy clay loam to silt loam	CL-ML, CL	A-6, A-4	0	0	90-100	85-100	70-90	50-75	25-35	5-15
96C: Macar-----	0-6	Loam	CL-ML	A-4	0	0	100	100	75-95	55-70	25-30	5-10
	6-15	Clay loam, loam, silty clay loam	CL-ML, CL	A-6, A-4	0	0	100	100	75-95	60-85	25-40	5-15
	15-45	Clay loam, loam, silty clay loam	CL-ML, CL	A-6, A-4	0	0	100	100	75-95	60-85	25-40	5-15
	45-60	Stratified sandy clay loam to silt loam	CL-ML, CL	A-6, A-4	0	0	90-100	85-100	70-90	50-75	25-35	5-15
98B: Kremlin-----	0-6	Loam	CL-ML	A-4	0	0	95-100	90-100	75-95	50-75	25-30	5-10
	6-11	Loam, clay loam	CL-ML, CL	A-4, A-6	0	0	95-100	90-100	75-95	55-80	25-35	5-15
	11-30	Loam, clay loam	CL-ML, CL	A-4, A-6	0	0	95-100	90-100	75-95	55-80	25-35	5-15
	30-60	Stratified sandy loam to clay loam	ML, CL- ML	A-4	0	0	90-100	85-100	70-90	50-75	20-30	NP-10

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4 10 40 200					
	In				Pct	Pct					Pct	
98C:												
Kremlin-----	0-6	Loam	CL-ML	A-4	0	0	95-100	90-100	75-95	50-75	25-30	5-10
	6-11	Loam, clay loam	CL-ML,	A-4,	0	0	95-100	90-100	75-95	55-80	25-35	5-15
			CL	A-6								
	11-30	Loam, clay loam	CL-ML,	A-4,	0	0	95-100	90-100	75-95	55-80	25-35	5-15
			CL	A-6								
	30-60	Stratified loam to clay loam	ML, CL- ML	A-4	0	0	90-100	85-100	70-90	50-75	20-30	NP-10
99:												
Rivra-----	0-6	Sandy loam	SM	A-4,	0	0-5	90-100	80-100	50-75	30-45	20-25	NP-5
				A-2								
	6-60	Extremely gravelly loamy coarse sand, extremely gravelly sand, very gravelly sand	GP-GM, GP	A-1	0	15-30	25-55	15-45	5-25	0-10	---	NP
Hanly-----	0-5	Loamy sand	SM	A-2	0	0	100	100	50-75	15-30	---	NP
	5-60	Stratified fine sandy loam to sand	SM, SP- SM	A-2, A-3	0	0	100	100	50-85	5-25	---	NP
110C:												
Laceycreek-----	0-18	Loam	CL-ML	A-4	0	0-5	90-100	80-100	75-95	55-75	25-30	5-10
	18-26	Loam, clay loam	CL	A-6	0	0-5	90-100	85-100	70-95	50-80	30-35	10-15
	26-44	Clay loam, sandy clay loam, gravelly loam	CL-ML, CL, SC- SM, SC	A-4, A-6	0	0-5	85-100	75-100	60-95	35-70	25-35	5-15
	44-60	Loam, sandy loam, gravelly sandy loam	SC-SM, CL-ML, SM, ML	A-2, A-4	0	0-5	80-100	70-100	40-70	25-60	20-30	NP-10
110D:												
Laceycreek-----	0-18	Loam	CL-ML	A-4	0	0-5	90-100	80-100	75-95	55-75	25-30	5-10
	18-26	Loam, clay loam	CL	A-6	0	0-5	90-100	85-100	70-95	50-80	30-35	10-15
	26-44	Clay loam, sandy clay loam, gravelly loam	CL-ML, CL, SC- SM, SC	A-4, A-6	0	0-5	85-100	75-100	60-95	35-70	25-35	5-15
	44-60	Loam, sandy loam, gravelly sandy loam	SC-SM, CL-ML, SM, ML	A-2, A-4	0	0-5	80-100	70-100	40-70	25-60	20-30	NP-10
110E:												
Laceycreek-----	0-18	Loam	CL-ML	A-4	0	0-5	90-100	80-100	75-95	55-75	25-30	5-10
	18-26	Loam, clay loam	CL	A-6	0	0-5	90-100	85-100	70-95	50-80	30-35	10-15
	26-44	Clay loam, sandy clay loam, gravelly loam	CL-ML, CL, SC- SM, SC	A-4, A-6	0	0-5	85-100	75-100	60-95	35-70	25-35	5-15
	44-60	Loam, sandy loam, gravelly sandy loam	SC-SM, CL-ML, SM, ML	A-2, A-4	0	0-5	80-100	70-100	40-70	25-60	20-30	NP-10

[illegible]

[illegible]

Engineering Index Properties--Continued

[illegible]

[illegible]

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
210E: (cont.)												
Gerber-----	0-6	Clay	CL, CH	A-7	0	0	100	95-100	90-100	80-95	40-55	15-30
	6-14	Silty clay, clay	CL, CH	A-7	0	0	100	95-100	85-100	75-95	40-65	20-45
	14-30	Clay, silty clay loam, clay loam	CL, CH	A-7, A-6	0	0	95-100	90-100	85-100	75-95	35-55	15-35
	30-60	Clay loam, clay, silty clay loam	CL, CH	A-7, A-6	0	0	95-100	90-100	80-100	65-95	35-55	15-35
211F:												
Cabbart-----	0-4	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	4-18	Loam, clay loam, silty clay loam	CL, CL- ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	18-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Yawdim-----	0-3	Silty clay loam	CL	A-6, A-7	0	0	100	100	90-100	80-90	30-45	10-20
	3-16	Silty clay loam, silty clay	CL, CH	A-7	0	0	100	100	90-100	70-95	40-60	15-35
	16-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
Rock outcrop----												
212F:												
Cabbart-----	0-4	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	4-18	Loam, clay loam, silty clay loam	CL, CL- ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	18-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Hillon-----	0-4	Loam	ML, CL, CL- ML	A-4, A-6	0	0-5	85-100	80-100	80-90	65-75	20-35	NP-15
	4-60	Loam, clay loam	CL	A-6	0	0-5	85-100	80-100	80-90	65-80	25-35	10-20
221E:												
Hillon-----	0-4	Clay loam	CL	A-6	0	0-5	85-100	85-100	85-95	70-80	25-35	10-20
	4-60	Loam, clay loam	CL	A-6	0	0-5	85-100	80-100	80-90	65-80	25-35	10-20
Kevin-----	0-6	Clay loam	CL	A-6	0	0-5	90-100	85-100	80-95	70-80	25-40	10-20
	6-9	Clay loam, clay	CL	A-6, A-7	0	0-5	90-100	85-100	80-95	70-80	35-50	15-25
	9-31	Clay loam	CL	A-6	0	0-5	90-100	85-100	80-95	70-80	30-40	10-20
	31-60	Clay loam	CL	A-6	0	0-5	90-100	85-100	80-95	70-80	30-40	10-20
222D:												
Hillon-----	0-4	Loam	ML, CL, CL- ML	A-4, A-6	0	0-5	85-100	80-100	80-90	65-75	20-35	NP-15
	4-60	Loam, clay loam	CL	A-6	0	0-5	85-100	80-100	80-90	65-80	25-35	10-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
222D: (cont.)												
Delpoint-----	0-4	Loam	CL-ML	A-4	0	0	95-100	90-100	75-90	55-75	20-30	5-10
	4-12	Loam, clay loam	CL-ML, CL	A-4, A-6	0	0	95-100	90-100	80-95	65-85	20-40	5-20
	12-30	Loam, clay loam, silty clay loam	CL-ML, CL	A-4, A-6	0	0	90-100	85-100	75-90	60-80	20-40	5-20
	30-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
223E:												
Hillon-----	0-4	Loam	ML, CL, CL- ML	A-4, A-6	0	0-5	85-100	80-100	80-90	65-75	20-35	NP-15
	4-60	Loam, clay loam	CL	A-6	0	0-5	85-100	80-100	80-90	65-80	25-35	10-20
Fleak-----	0-3	Loamy fine sand	SM	A-2	0	0-5	95-100	95-100	70-90	20-35	---	NP
	3-18	Fine sand, loamy fine sand	SM	A-2	0	0-5	95-100	95-100	70-85	20-35	---	NP
	18-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
224E:												
Hillon-----	0-4	Loam	ML, CL, CL- ML	A-4, A-6	0	0-5	85-100	80-100	80-90	65-75	20-35	NP-15
	4-60	Loam, clay loam	CL	A-6	0	0-5	85-100	80-100	80-90	65-80	25-35	10-20
Joplin-----	0-6	Loam	CL-ML, ML	A-4	0	0-5	95-100	95-100	85-90	60-75	25-35	5-10
	6-9	Loam, clay loam	CL	A-6	0	0-5	95-100	90-100	80-95	60-75	30-40	10-15
	9-38	Loam, clay loam	CL-ML, CL	A-4, A-6	0	0-5	70-95	65-95	60-90	40-75	25-40	5-15
	38-60	Loam, clay loam	CL-ML, CL	A-4, A-6	0	0-5	70-95	65-95	60-90	40-75	25-40	5-15
227F:												
Hillon-----	0-4	Loam	ML, CL, CL- ML	A-4, A-6	0	0-5	85-100	80-100	80-90	65-75	20-35	NP-15
	4-60	Loam, clay loam	CL	A-6	0	0-5	85-100	80-100	80-90	65-80	25-35	10-20
Fleak-----	0-3	Loamy fine sand	SM	A-2	0	0-5	95-100	95-100	70-90	20-35	---	NP
	3-18	Fine sand, loamy fine sand	SM	A-2	0	0-5	95-100	95-100	70-85	20-35	---	NP
	18-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
Rock outcrop----												
229E:												
Hillon-----	0-4	Clay loam	CL	A-6	0	0-5	85-100	85-100	85-95	70-80	25-35	10-20
	4-60	Loam, clay loam	CL	A-6	0	0-5	85-100	80-100	80-90	65-80	25-35	10-20
Lambeth-----	0-4	Silt loam	CL-ML	A-4	0	0	100	100	90-100	75-90	20-30	5-10
	4-60	Silt loam, silty clay loam	CL, CL- ML	A-4, A-6	0	0	100	100	90-100	75-90	20-40	5-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	sieve number--					
							4	10	40	200		
	In				Pct	Pct					Pct	
232A:												
Acel-----	0-6	Silty clay loam	CL	A-6	0	0	95-100	95-100	85-100	80-95	30-40	10-15
	6-20	Silty clay, clay	CL, CH	A-7	0	0	95-100	95-100	85-100	75-95	40-60	20-40
	20-60	Silty clay loam, silty clay, clay loam	CL	A-6, A-7	0	0-5	85-100	80-100	70-100	55-80	35-50	15-30
251C:												
Bascovy-----	0-4	Silty clay	CH, CL	A-7	0	0	90-100	75-100	70-95	60-95	40-60	20-35
	4-15	Clay, silty clay	CH	A-7	0	0	90-100	75-100	70-95	60-95	50-70	25-45
	15-29	Clay, silty clay	CH	A-7	0	0	90-100	75-100	70-95	60-95	50-70	25-45
	29-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Neldore-----	0-4	Silty clay	CL, CH	A-7	0	0-10	95-100	90-100	75-100	70-95	40-55	20-30
	4-15	Clay, silty clay	CL, CH	A-7	0	0	90-100	85-100	70-95	65-90	40-60	20-40
	15-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
251E:												
Bascovy-----	0-4	Silty clay	CH, CL	A-7	0	0	90-100	75-100	70-95	60-95	40-60	20-35
	4-15	Clay, silty clay	CH	A-7	0	0	90-100	75-100	70-95	60-95	50-70	25-45
	15-29	Clay, silty clay	CH	A-7	0	0	90-100	75-100	70-95	60-95	50-70	25-45
	29-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Neldore-----	0-4	Silty clay	CL, CH	A-7	0	0-10	95-100	90-100	75-100	70-95	40-55	20-30
	4-15	Clay, silty clay	CL, CH	A-7	0	0	90-100	85-100	70-95	65-90	40-60	20-40
	15-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
252C:												
Bascovy-----	0-4	Silty clay	CH, CL	A-7	0	0	90-100	75-100	70-95	60-95	40-60	20-35
	4-15	Clay, silty clay	CH	A-7	0	0	90-100	75-100	70-95	60-95	50-70	25-45
	15-29	Clay, silty clay	CH	A-7	0	0	90-100	75-100	70-95	60-95	50-70	25-45
	29-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Marvan-----	0-3	Silty clay	CL, CH	A-7	0	0	100	100	95-100	85-100	40-65	20-45
	3-46	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-100	45-70	25-50
	46-60	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-100	45-70	25-50
261B:												
Absher-----	0-7	Clay	CL, CH	A-7	0	0	95-100	75-100	70-100	60-95	40-60	20-35
	7-11	Silty clay, clay, clay loam	CL, CH	A-7	0	0	95-100	75-100	70-100	60-95	40-60	20-40
	11-60	Clay loam, silty clay loam, silty clay	CL, CH	A-7	0	0	95-100	75-100	70-100	60-95	40-55	20-35

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
261B: (cont.)												
Nobe-----	0-7	Silty clay	CL, CH	A-7	0	0	100	100	90-100	80-95	40-55	15-30
	7-20	Silty clay, clay, silty clay loam	CL, CH	A-7	0	0	100	100	95-100	90-95	40-60	20-35
	20-60	Stratified loam to clay	CL, CH	A-7, A-6	0	0	100	100	85-100	75-90	35-55	15-30
263A:												
Toston-----	0-6	Clay loam	CL	A-6	0	0	100	100	90-100	70-80	30-35	10-15
	6-9	Silty clay, silty clay loam	CL	A-7	0	0	100	100	95-100	85-95	40-50	20-25
	9-16	Silty clay loam	CL	A-6	0	0	100	100	95-100	85-95	30-35	10-15
	16-60	Stratified silty clay loam to fine sandy loam	CL, CL-	A-6, A-4	0	0	100	100	70-90	50-70	20-35	5-15
264A:												
Toston-----	0-6	Clay loam	CL	A-6	0	0	100	100	90-100	70-80	30-35	10-15
	6-9	Silty clay, silty clay loam	CL	A-7	0	0	100	100	95-100	85-95	40-50	20-25
	9-16	Silty clay loam	CL	A-6	0	0	100	100	95-100	85-95	30-35	10-15
	16-60	Stratified silty clay loam to fine sandy loam	CL, CL-	A-6, A-4	0	0	100	100	70-90	50-70	20-35	5-15
Nobe-----	0-5	Silty clay	CL, CH	A-7	0	0	100	100	90-100	75-90	40-65	20-40
	5-38	Silty clay, clay, silty clay loam	CL, CH	A-7	0	0	100	100	90-100	75-95	40-65	20-40
	38-60	Stratified loam to clay	CL, CH	A-7, A-6	0	0	100	100	85-100	65-85	35-60	15-35
265B:												
Absher-----	0-7	Clay	CL, CH	A-7	0	0	95-100	75-100	70-100	60-95	40-60	20-35
	7-11	Silty clay, clay, clay loam	CL, CH	A-7	0	0	95-100	75-100	70-100	60-95	40-60	20-40
	11-60	Clay loam, silty clay loam, silty clay	CL, CH	A-7	0	0	95-100	75-100	70-100	60-95	40-55	20-35
Gerdrum-----	0-7	Clay loam	CL	A-6	0	0	80-100	75-100	65-95	60-90	25-40	10-20
	7-16	Clay, silty clay, silty clay loam	CL, CH	A-7	0	0	90-100	90-100	85-100	75-95	40-60	20-40
	16-60	Clay loam, sandy clay loam, clay	CL, SC, CH	A-6, A-7	0	0	90-100	90-100	80-95	45-75	35-55	15-35
272C:												
Attewan-----	0-5	Loam	ML, CL-	A-4	0	0-5	85-100	80-100	70-90	55-75	20-30	NP-10
	5-17	Clay loam, loam, gravelly loam	CL, SC	A-6	0	0-5	75-100	70-100	55-85	35-70	30-40	10-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
272C: (cont.)												
Attewan(cont.) --	17-27	Clay loam, gravelly loam, loam	CL, SC, GC	A-6	0	0-5	70-100	65-100	50-85	35-65	30-40	10-20
	27-60	Very gravelly loamy sand, extremely gravelly loamy sand, very gravelly sand	GP, GP- GM, GM, SM	A-1	0	0-15	25-55	15-50	5-20	0-15	---	NP
Tinsley-----	0-6	Gravelly sandy loam	SM	A-2, A-1	0	0-10	70-90	55-75	35-55	15-35	15-20	NP-5
	6-60	Very gravelly sand, very cobbly loamy sand, extremely gravelly sand	GM, SM, SP- SM, GP- GM	A-1	0	10-40	40-70	25-55	10-35	5-15	---	NP
301A:												
Marvan-----	0-3	Clay	CL, CH	A-7	0	0	100	100	90-100	75-95	40-70	25-50
	3-46	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-100	45-70	25-50
	46-60	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-100	45-70	25-50
Vanda-----	0-7	Clay	CL, CH	A-7	0	0	100	100	95-100	75-95	40-65	20-45
	7-60	Clay, silty clay, silty clay loam	CL, CH	A-7, A-6	0	0	100	100	95-100	80-95	35-65	15-45
301C:												
Marvan-----	0-3	Clay	CL, CH	A-7	0	0	100	100	90-100	75-95	40-70	25-50
	3-46	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-100	45-70	25-50
	46-60	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-100	45-70	25-50
Vanda-----	0-7	Clay	CL, CH	A-7	0	0	100	100	95-100	75-95	40-65	20-45
	7-60	Clay, silty clay, silty clay loam	CL, CH	A-7, A-6	0	0	100	100	95-100	80-95	35-65	15-45
303A:												
Flatcreek-----	0-3	Silty clay	CL, CH	A-7	0	0	100	100	95-100	90-95	45-65	25-45
	3-11	Silty clay, clay	CL, CH	A-7	0	0	100	100	90-100	75-95	45-65	25-45
	11-20	Silty clay, clay	CL, CH	A-7	0	0	100	100	90-100	75-95	45-65	25-45
	20-60	Stratified silty clay to clay	CL, CH	A-7	0	0	100	100	90-100	75-95	45-65	25-45
Nobe-----	0-2	Silty clay	CL, CH	A-7	0	0	100	100	90-100	75-90	40-65	20-40
	2-60	Silty clay, clay, silty clay loam	CL, CH	A-7	0	0	100	100	90-100	75-95	40-65	20-40

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
305A:												
Marvan-----	0-7	Clay	CL, CH	A-7	0	0	100	100	90-100	75-95	40-70	25-50
	7-20	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-100	45-70	25-50
	20-60	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-100	45-70	25-50
Nobe-----	0-7	Clay	CL, CH	A-7	0	0	100	100	90-100	80-95	40-55	15-30
	7-20	Silty clay, clay, silty clay loam	CL, CH	A-7	0	0	100	100	95-100	90-95	40-60	20-35
	20-60	Stratified loam to clay	CL, CH	A-7, A-6	0	0	100	100	85-100	75-90	35-55	15-30
311B:												
Ferd-----	0-3	Loam	CL-ML, CL	A-4	0	0	100	95-100	80-95	55-75	25-30	5-10
	3-8	Loam, clay loam, silty clay loam	CL, CL- ML	A-4, A-6	0	0	100	95-100	85-95	70-90	25-40	5-15
	8-13	Clay loam, silty clay loam, clay	CL	A-6, A-7	0	0	100	95-100	85-100	70-90	35-50	15-30
	13-32	Clay loam, silty clay loam	CL	A-6	0	0	100	95-100	85-100	70-90	30-40	10-20
	32-60	Clay loam, silty clay loam	CL	A-6	0	0	100	95-100	85-100	70-90	30-40	10-20
Creed-----	0-6	Loam	CL-ML, SC-SM	A-4	0	0	90-100	75-100	65-95	45-75	20-30	5-10
	6-12	Silty clay, clay, silty clay loam	CL, CH	A-6, A-7	0	0	90-100	75-100	70-100	60-95	35-60	15-35
	12-26	Silty clay loam, clay loam	CL, SC	A-6, A-7	0	0	90-100	75-100	60-100	35-90	30-50	15-25
	26-60	Stratified loam to silty clay loam	CL	A-6, A-7	0	0	90-100	75-100	65-100	50-90	30-45	10-20
Gerdrum-----	0-7	Clay loam	CL	A-6	0	0	80-100	75-100	65-95	60-90	25-40	10-20
	7-16	Clay, silty clay, silty clay loam	CL, CH	A-7	0	0	90-100	90-100	85-100	75-95	40-60	20-40
	16-60	Clay loam, sandy clay loam, clay	CL, SC, CH	A-6, A-7	0	0	90-100	90-100	80-95	45-75	35-55	15-35
311C:												
Ferd-----	0-3	Loam	CL-ML, CL	A-4	0	0	100	95-100	80-95	55-75	25-30	5-10
	3-8	Loam, clay loam, silty clay loam	CL, CL- ML	A-4, A-6	0	0	100	95-100	85-95	70-90	25-40	5-15
	8-13	Clay loam, silty clay loam, clay	CL	A-6, A-7	0	0	100	95-100	85-100	70-90	35-50	15-30
	13-32	Clay loam, silty clay loam	CL	A-6	0	0	100	95-100	85-100	70-90	30-40	10-20
	32-60	Clay loam, silty clay loam	CL	A-6	0	0	100	95-100	85-100	70-90	30-40	10-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	sieve number--					
							4	10	40	200		
	In				Pct	Pct					Pct	
311C: (cont.)												
Creed-----	0-6	Loam	CL-ML, SC-SM	A-4	0	0	90-100	75-100	65-95	45-75	20-30	5-10
	6-12	Silty clay, clay, silty clay loam	CL, CH	A-6, A-7	0	0	90-100	75-100	70-100	60-95	35-60	15-35
	12-26	Silty clay loam, clay loam	CL	A-6, A-7	0	0	90-100	75-100	60-100	35-90	30-50	15-25
	26-60	Stratified loam to silty clay loam	CL	A-6, A-7	0	0	90-100	75-100	65-100	50-90	30-45	10-20
Gerdum-----	0-7	Clay loam	CL	A-6	0	0	80-100	75-100	65-95	60-90	25-40	10-20
	7-16	Clay, silty clay, silty clay loam	CL, CH	A-7	0	0	90-100	90-100	85-100	75-95	40-60	20-40
	16-60	Clay loam, sandy clay loam, clay	CL, SC, CH	A-6, A-7	0	0	90-100	90-100	80-95	45-75	35-55	15-35
323B:												
Sagedale-----	0-4	Silty clay loam	CL	A-6	0	0	100	100	95-100	85-95	30-40	10-20
	4-15	Silty clay loam, silty clay	CL	A-6, A-7	0	0	75-100	70-100	65-100	60-95	35-45	15-25
	15-30	Silty clay loam, silty clay	CL	A-6, A-7	0	0	75-100	70-100	65-100	60-95	35-45	15-25
	30-60	Silty clay loam, silty clay	CL	A-6, A-7	0	0	75-100	70-100	65-100	60-95	35-45	15-25
323C:												
Sagedale-----	0-4	Silty clay loam	CL	A-6	0	0	100	100	95-100	85-95	30-40	10-20
	4-15	Silty clay loam, silty clay	CL	A-6, A-7	0	0	75-100	70-100	65-100	60-95	35-45	15-25
	15-30	Silty clay loam, silty clay	CL	A-6, A-7	0	0	75-100	70-100	65-100	60-95	35-45	15-25
	30-60	Silty clay loam, silty clay	CL	A-6, A-7	0	0	75-100	70-100	65-100	60-95	35-45	15-25
324B:												
Marcott-----	0-4	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	90-95	35-45	15-20
	4-15	Silty clay, silty clay loam	CL, CH	A-6, A-7	0	0	100	100	95-100	85-95	35-55	15-30
	15-30	Silty clay, silty clay loam, clay loam	CL, CH	A-6, A-7	0	0	100	100	90-100	75-95	35-55	15-30
	30-60	Silty clay loam, clay loam, silty clay	CL, CH	A-6, A-7	0	0	90-100	85-100	75-100	65-95	35-55	15-30

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
331B:												
Phillips-----	0-8	Loam	CL-ML	A-4	0	0-5	85-100	80-100	75-100	55-80	20-30	5-10
	8-15	Clay, clay loam	CL	A-6,	0	0-5	85-100	80-100	70-95	60-85	35-50	15-25
				A-7								
	15-32	Clay loam, loam	CL	A-6,	0	0-5	85-100	80-100	75-100	55-80	30-45	10-20
				A-7								
	32-60	Clay loam, loam	CL, CL-	A-6,	0	0-5	85-100	80-100	70-90	55-75	25-40	5-15
			ML	A-4								
Elloam-----	0-7	Clay loam	CL	A-6	0	0-5	95-100	80-100	70-100	55-80	30-40	10-15
	7-12	Clay loam, clay	CL	A-6,	0	0-5	95-100	80-100	70-100	55-90	35-50	15-30
				A-7								
	12-18	Clay loam, clay	CL	A-6,	0	0-5	95-100	80-100	65-100	50-80	30-45	10-20
				A-7								
	18-60	Clay loam, loam	CL	A-7,	0	0-5	95-100	80-100	65-100	50-80	30-45	10-20
				A-6								
331C:												
Phillips-----	0-8	Loam	CL-ML	A-4	0	0-5	85-100	80-100	75-100	55-80	20-30	5-10
	8-15	Clay, clay loam	CL	A-6,	0	0-5	85-100	80-100	70-95	60-85	35-50	15-25
				A-7								
	15-32	Clay loam, loam	CL	A-6,	0	0-5	85-100	80-100	75-100	55-80	30-45	10-20
				A-7								
	32-60	Clay loam, loam	CL, CL-	A-6,	0	0-5	85-100	80-100	70-90	55-75	25-40	5-15
			ML	A-4								
Elloam-----	0-7	Clay loam	CL	A-6	0	0-5	95-100	80-100	70-100	55-80	30-40	10-15
	7-12	Clay loam, clay	CL	A-6,	0	0-5	95-100	80-100	70-100	55-90	35-50	15-30
				A-7								
	12-18	Clay loam, clay	CL	A-6,	0	0-5	95-100	80-100	65-100	50-80	30-45	10-20
				A-7								
	18-60	Clay loam, loam	CL	A-7,	0	0-5	95-100	80-100	65-100	50-80	30-45	10-20
				A-6								
334B:												
Phillips-----	0-8	Loam	CL-ML	A-4	0	0-5	85-100	80-100	75-100	55-80	20-30	5-10
	8-15	Clay, clay loam	CL	A-6,	0	0-5	85-100	80-100	70-95	60-85	35-50	15-25
				A-7								
	15-32	Clay loam, loam	CL	A-6,	0	0-5	85-100	80-100	75-100	55-80	30-45	10-20
				A-7								
	32-60	Clay loam, loam	CL, CL-	A-6,	0	0-5	85-100	80-100	70-90	55-75	25-40	5-15
			ML	A-4								
Kevin-----	0-6	Clay loam	CL	A-6	0	0-5	90-100	85-100	80-95	70-80	25-40	10-20
	6-9	Clay loam, clay	CL	A-6,	0	0-5	90-100	85-100	80-95	70-80	35-50	15-25
				A-7								
	9-31	Clay loam	CL	A-6	0	0-5	90-100	85-100	80-95	70-80	30-40	10-20
	31-60	Clay loam	CL	A-6	0	0-5	90-100	85-100	80-95	70-80	30-40	10-20
341B:												
Linnet-----	0-7	Silty clay	CL	A-7	0	0	90-100	85-100	80-100	75-95	40-50	15-25
	7-14	Silty clay, clay	CL, CH	A-7	0	0	90-100	85-100	75-100	60-90	45-65	25-45
	14-36	Silty clay, clay, silty clay loam	CL, CH	A-6, A-7	0	0-5	85-100	80-100	70-100	55-90	35-55	15-35
	36-60	Clay loam, silty clay loam, silty clay	CL, CH	A-6, A-7	0	0-5	85-100	80-100	65-95	50-85	35-55	15-35

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
341B: (cont.)												
Marias-----	0-6	Silty clay	CL, CH	A-7	0	0	100	100	95-100	90-95	40-60	20-40
	6-38	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-95	40-70	25-50
	38-60	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-95	40-70	25-50
351B:												
Kenilworth-----	0-5	Fine sandy loam	ML, SM	A-4	0	0	100	100	70-85	40-55	15-25	NP-5
	5-12	Fine sandy loam, sandy clay loam	CL-ML, SC-SM	A-4	0	0	100	100	75-90	35-55	20-30	5-10
	12-16	Sandy clay loam, clay loam	CL, SC	A-6	0	0	100	100	85-95	45-75	25-35	10-15
	16-29	Clay loam, silty clay loam	CL	A-6	0	0	95-100	90-100	80-100	70-90	30-40	10-20
	29-60	Clay loam, silty clay loam	CL	A-6	0	0	95-100	90-100	80-100	70-90	30-40	10-20
Fortbenton-----	0-7	Fine sandy loam	SM	A-4	0	0	100	100	70-85	35-50	15-25	NP-5
	7-24	Fine sandy loam, sandy loam	SM	A-4	0	0	100	100	70-85	35-50	15-25	NP-5
	24-60	Silty clay loam, clay loam	CL	A-6	0	0	100	100	80-95	70-95	30-40	10-15
361B:												
Fortbenton-----	0-6	Fine sandy loam	SM	A-4	0	0	100	100	70-85	35-50	15-25	NP-5
	6-23	Fine sandy loam, sandy loam	SM	A-4	0	0	100	100	70-85	35-50	15-25	NP-5
	23-60	Silty clay loam, clay loam	CL	A-6	0	0	100	100	80-95	70-95	30-40	10-15
362C:												
Chinook-----	0-5	Fine sandy loam	SM	A-4, A-2	0	0	80-100	75-100	65-85	30-50	15-25	NP-5
	5-24	Fine sandy loam, sandy loam	SM	A-4, A-2	0	0	80-100	75-100	55-85	30-50	15-25	NP-5
	24-60	Fine sandy loam, loamy fine sand, sandy loam	SM	A-4, A-2	0	0	80-100	75-100	60-80	25-45	15-25	NP-5
Yetull-----	0-6	Loamy fine sand	SM	A-2	0	0-5	95-100	95-100	50-75	10-30	---	NP
	6-60	Loamy sand, fine sand, loamy fine sand	SM, SP- SM	A-1, A-3, A-2	0	0-5	95-100	95-100	45-70	5-30	---	NP
363B:												
Cozberg-----	0-6	Fine sandy loam	SM	A-4	0	0	95-100	95-100	70-85	35-50	20-30	NP-5
	6-34	Fine sandy loam, sandy loam	SM, ML	A-4	0	0	95-100	80-100	60-90	35-60	20-30	NP-5
	34-60	Loamy sand, sand, gravelly loamy sand	SM, SP- SM	A-1, A-2, A-3	0	0	60-100	50-95	25-70	5-30	---	NP

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index		
			Unified	AASHTO	>10 inches	3-10 inches								
							4	10	40	200				
	In				Pct	Pct					Pct			
363B: (cont.)														
Chinook-----	0-5	Fine sandy loam	SM	A-4,	0	0	80-100	75-100	65-85	30-50	15-25	NP-5		
				A-2										
	5-24	Fine sandy loam, sandy loam	SM	A-4,	0	0	80-100	75-100	55-85	30-50	15-25	NP-5		
				A-2										
	24-60	Fine sandy loam, loamy fine sand, sandy loam	SM	A-4,	0	0	80-100	75-100	60-80	25-45	15-25	NP-5		
				A-2										
363C:														
Chinook-----	0-5	Fine sandy loam	SM	A-4,	0	0	80-100	75-100	65-85	30-50	15-25	NP-5		
				A-2										
	5-24	Fine sandy loam, sandy loam	SM	A-4,	0	0	80-100	75-100	55-85	30-50	15-25	NP-5		
				A-2										
	24-60	Fine sandy loam, loamy fine sand, sandy loam	SM	A-4,	0	0	80-100	75-100	60-80	25-45	15-25	NP-5		
				A-2										
Lihen-----	0-12	Fine sandy loam	SM	A-4	0	0	100	85-100	60-80	35-50	20-25	NP-5		
	12-60	Loamy fine sand, loamy sand, sand	SM	A-2,	0	0	100	85-100	45-75	15-35	---	NP		
				A-1										
364B:														
Chinook-----	0-11	Loam	CL-ML	A-4	0	0	80-100	75-100	70-95	50-75	20-30	5-10		
	11-35	Fine sandy loam, sandy loam	SM	A-4,	0	0	80-100	75-100	55-85	30-50	15-25	NP-5		
				A-2										
	35-60	Fine sandy loam, loamy fine sand, sandy loam	SM	A-4,	0	0	80-100	75-100	60-80	25-45	15-25	NP-5		
				A-2										
364C:														
Chinook-----	0-11	Loam	CL-ML	A-4	0	0	80-100	75-100	70-95	50-75	20-30	5-10		
	11-35	Fine sandy loam, sandy loam	SM	A-4,	0	0	80-100	75-100	55-85	30-50	15-25	NP-5		
				A-2										
	35-60	Fine sandy loam, loamy fine sand, sandy loam	SM	A-4,	0	0	80-100	75-100	60-80	25-45	15-25	NP-5		
				A-2										
365B:														
Fortbenton-----	0-6	Fine sandy loam	SM	A-4	0	0	100	100	70-85	35-50	15-25	NP-5		
	6-23	Fine sandy loam, sandy loam	SM	A-4	0	0	100	100	70-85	35-50	15-25	NP-5		
	23-60	Silty clay loam, clay loam	CL	A-6	0	0	100	100	80-95	70-95	30-40	10-15		

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
365B: (cont.)												
Chinook-----	0-5	Fine sandy loam	SM	A-4, A-2	0	0	80-100	75-100	65-85	30-50	15-25	NP-5
	5-24	Fine sandy loam, sandy loam	SM	A-4, A-2	0	0	80-100	75-100	55-85	30-50	15-25	NP-5
	24-60	Fine sandy loam, loamy fine sand, sandy loam	SM	A-4, A-2	0	0	80-100	75-100	60-80	25-45	15-25	NP-5
368C:												
Fortbenton-----	0-7	Fine sandy loam	SM	A-4	0	0	100	100	70-85	35-50	15-25	NP-5
	7-24	Fine sandy loam, sandy loam	SM	A-4	0	0	100	100	70-85	35-50	15-25	NP-5
	24-60	Clay loam	CL	A-6	0	0	100	100	80-95	70-95	30-40	10-15
Hillon-----	0-4	Loam	ML, CL, CL- ML	A-4, A-6	0	0-5	85-100	80-100	80-90	65-75	20-35	NP-15
	4-60	Loam, clay loam	CL	A-6	0	0-5	85-100	80-100	80-90	65-80	25-35	10-20
372C:												
Evanston-----	0-6	Loam	CL, CL- ML	A-4, A-6	0	0-5	95-100	95-100	85-90	65-70	25-35	5-15
	6-14	Clay loam, loam	CL	A-6	0	0-5	95-100	95-100	85-100	65-85	25-35	10-15
	14-25	Clay loam, loam, silty clay loam	CL	A-6	0	0-5	95-100	95-100	85-100	65-85	25-35	10-15
	25-60	Loam, clay loam, fine sandy loam	CL	A-6	0	0-5	95-100	95-100	70-90	50-75	25-35	10-15
Yamacall-----	0-5	Loam	CL-ML	A-4	0	0-5	85-100	80-100	65-85	55-75	25-30	5-10
	5-38	Loam, clay loam	CL-ML, CL	A-4, A-6	0	0-5	85-100	80-100	60-85	55-75	25-35	5-15
	38-60	Loam, fine sandy loam, clay loam	CL-ML, SM	A-4, A-2	0	0-5	75-100	70-100	50-80	25-55	15-30	NP-10
375B:												
Evanston-----	0-6	Loam	CL, CL- ML	A-4, A-6	0	0-5	95-100	95-100	85-90	65-70	25-35	5-15
	6-12	Clay loam, loam	CL	A-6	0	0-5	95-100	95-100	85-100	65-85	25-35	10-15
	12-60	Clay loam, silty clay loam	CL	A-6	0	0-5	95-100	95-100	85-100	65-85	25-35	10-15
Lonna-----	0-7	Loam	CL-ML	A-4	0	0	100	100	90-100	75-90	25-30	5-10
	7-16	Silt loam, silty clay loam	CL-ML, CL	A-6, A-4	0	0	100	100	95-100	75-95	25-40	5-15
	16-30	Silt loam, silty clay loam	CL-ML, CL	A-6, A-4	0	0	100	100	95-100	75-95	25-40	5-15
	30-60	Silty clay loam, silt loam, very fine sandy loam	CL-ML, CL	A-6, A-4	0	0	100	100	95-100	75-90	25-35	5-15

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	sieve number--					
							4	10	40	200		
	In				Pct	Pct					Pct	
377B: Evanston-----	0-6	Loam	CL, CL-	A-4, A-6	0	0-5	95-100	95-100	85-90	65-70	25-35	5-15
	6-14	Clay loam, loam	CL	A-6	0	0-5	95-100	95-100	85-100	65-85	25-35	10-15
	14-25	Clay loam, loam, silty clay loam	CL	A-6	0	0-5	95-100	95-100	85-100	65-85	25-35	10-15
	25-60	Loam, clay loam, fine sandy loam	CL	A-6	0	0-5	95-100	95-100	70-90	50-75	25-35	10-15
Degrad-----	0-6	Loam	ML, SM	A-4	0	0-5	85-100	80-100	60-85	40-60	25-35	NP-10
	6-11	Sandy clay loam, clay loam	CL, SC, CL-	A-6, A-4	0	0-5	85-100	80-100	50-90	35-80	25-40	5-15
	11-28	Clay loam, loam, sandy loam	ML, SC- SM	A-4	0	0-5	85-100	80-100	55-85	40-70	20-35	NP-10
	28-60	Sand, gravelly sand, loamy sand	SP, SP- SM, SM	A-1, A-3, A-2	0	0-5	65-100	55-100	25-70	0-15	---	NP
381B: Ethridge-----	0-5	Clay loam	CL	A-6	0	0	100	95-100	85-100	70-80	25-40	10-20
	5-12	Silty clay, silty clay loam, clay	CL	A-7	0	0	100	95-100	95-100	90-95	40-50	20-30
	12-38	Clay loam, silty clay loam, clay	CL	A-6, A-7	0	0	100	95-100	90-100	85-95	35-50	15-30
	38-60	Silty clay loam, clay loam, silt loam	CL	A-6, A-7	0	0	100	95-100	90-100	85-95	30-50	10-25
385B: Ethridge-----	0-6	Silty clay loam	CL	A-6, A-7	0	0	100	95-100	90-100	85-95	25-45	10-20
	6-14	Silty clay, silty clay loam, clay	CL	A-7	0	0	100	95-100	95-100	90-95	40-50	20-30
	14-32	Clay loam, silty clay loam, clay	CL	A-6, A-7	0	0	100	95-100	90-100	85-95	35-50	15-30
	32-60	Silty clay loam, clay loam, silt loam	CL	A-6, A-7	0	0	100	95-100	90-100	85-95	30-50	10-25
Kobase-----	0-6	Silty clay loam	CL	A-7, A-6	0	0	95-100	90-100	85-100	80-95	30-45	10-20
	6-25	Silty clay loam, silty clay, clay	CL	A-7, A-6	0	0	95-100	90-100	85-100	75-95	35-50	15-25
	25-60	Silty clay loam, silty clay, clay	CL	A-7, A-6	0	0	95-100	90-100	85-100	75-95	35-50	15-25

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
386B: Ethrige-----	0-6	Silty clay loam	CL	A-6, A-7	0	0	100	95-100	90-100	85-95	25-45	10-20
	6-14	Silty clay, silty clay loam, clay	CL	A-7	0	0	100	95-100	95-100	90-95	40-50	20-30
	14-32	Clay loam, silty clay loam, clay	CL	A-6, A-7	0	0	100	95-100	90-100	85-95	35-50	15-30
	32-60	Silty clay loam, clay loam, silt loam	CL	A-6, A-7	0	0	100	95-100	90-100	85-95	30-50	10-25
Evanston-----	0-6	Loam	CL, CL- ML	A-4, A-6	0	0-5	95-100	95-100	85-90	65-70	25-35	5-15
	6-14	Clay loam, loam	CL	A-6	0	0-5	95-100	95-100	85-100	65-85	25-35	10-15
	14-25	Clay loam, loam, silty clay loam	CL	A-6	0	0-5	95-100	95-100	85-100	65-85	25-35	10-15
	25-60	Loam, clay loam, fine sandy loam	CL	A-6	0	0-5	95-100	95-100	70-90	50-75	25-35	10-15
388A: Ethrige-----	0-6	Silty clay loam	CL	A-6, A-7	0	0	100	95-100	90-100	85-95	25-45	10-20
	6-14	Silty clay, silty clay loam, clay	CL	A-7	0	0	100	95-100	95-100	90-95	40-50	20-30
	14-32	Clay loam, silty clay loam, clay	CL	A-6, A-7	0	0	100	95-100	90-100	85-95	35-50	15-30
	32-60	Silty clay loam, clay loam, silt loam	CL	A-6, A-7	0	0	100	95-100	90-100	85-95	30-50	10-25
Lonna-----	0-6	Silty clay loam	CL	A-6	0	0	100	100	95-100	85-95	30-35	10-15
	6-11	Silt loam, silty clay loam	CL-ML, CL	A-6, A-4	0	0	100	100	95-100	75-95	25-40	5-15
	11-34	Silt loam, silty clay loam	CL-ML, CL	A-6, A-4	0	0	100	100	95-100	75-95	25-40	5-15
	34-60	Silty clay loam, silt loam, very fine sandy loam	CL-ML, CL	A-6, A-4	0	0	100	100	95-100	75-90	25-35	5-15
402A: Gerdrum-----	0-7	Clay loam	CL	A-6	0	0	80-100	75-100	65-95	60-90	25-40	10-20
	7-16	Clay, silty clay, silty clay loam	CL, CH	A-7	0	0	90-100	90-100	85-100	75-95	40-60	20-40
	16-60	Clay loam, sandy clay loam, clay	CL, SC, CH	A-6, A-7	0	0	90-100	90-100	80-95	45-75	35-55	15-35

[illegible]

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
					Pct	Pct					Pct	
411E: (cont.) Farnuf-----	In											
	0-6	Loam	ML, CL	A-4	0	0	80-100	75-100	60-100	55-80	20-30	NP-10
			ML									
	6-18	Clay loam, loam	CL	A-6	0	0	80-100	75-100	65-95	50-90	25-40	10-20
	18-46	Loam, clay loam	CL, CL	A-6,	0	0	80-100	75-100	65-95	50-80	25-35	5-15
			ML	A-4								
	46-60	Stratified	CL,	A-6,	0	0-15	75-90	65-85	50-80	45-60	20-30	5-15
		gravelly sandy	SC, CL	A-4								
		loam to silty	ML, SC									
		clay loam	SM									
421C: Joplin-----	0-6	Loam	CL-ML,	A-4	0	0-5	95-100	95-100	85-90	60-75	25-35	5-10
			ML									
	6-9	Loam, clay loam	CL	A-6	0	0-5	95-100	90-100	80-95	60-75	30-40	10-15
	9-38	Loam, clay loam	CL-ML,	A-4,	0	0-5	70-95	65-95	60-90	40-75	25-40	5-15
			CL	A-6								
	38-60	Loam, clay loam	CL-ML,	A-4,	0	0-5	70-95	65-95	60-90	40-75	25-40	5-15
			CL	A-6								
Hillon-----	0-4	Loam	ML,	A-4,	0	0-5	85-100	80-100	80-90	65-75	20-35	NP-15
			CL, CL	A-6								
			ML									
	4-60	Loam, clay loam	CL	A-6	0	0-5	85-100	80-100	80-90	65-80	25-35	10-20
422C: Marmarth-----	0-7	Loam	CL-ML,	A-4	0	0	100	100	85-95	60-80	25-30	5-10
			CL									
	7-11	Clay loam, loam, sandy	CL-ML,	A-4,	0	0	100	100	90-100	60-80	25-40	5-20
		clay loam	CL	A-6								
	11-30	Loam, fine	CL-ML,	A-4,	0	0	100	100	90-100	60-80	25-35	5-15
		sandy loam,	CL	A-6								
		clay loam										
	30-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
441C: Kevin-----	0-6	Clay loam	CL	A-6	0	0-5	90-100	85-100	80-95	70-80	25-40	10-20
	6-9	Clay loam, clay	CL	A-6,	0	0-5	90-100	85-100	80-95	70-80	35-50	15-25
				A-7								
	9-31	Clay loam	CL	A-6	0	0-5	90-100	85-100	80-95	70-80	30-40	10-20
	31-60	Clay loam	CL	A-6	0	0-5	90-100	85-100	80-95	70-80	30-40	10-20
Hillon-----	0-4	Clay loam	CL	A-6	0	0-5	85-100	85-100	85-95	70-80	25-35	10-20
	4-60	Loam, clay loam	CL	A-6	0	0-5	85-100	80-100	80-90	65-80	25-35	10-20
442C: Kevin-----	0-6	Clay loam	CL	A-6	0	0-5	90-100	85-100	80-95	70-80	25-40	10-20
	6-9	Clay loam, clay	CL	A-6,	0	0-5	90-100	85-100	80-95	70-80	35-50	15-25
				A-7								
	9-31	Clay loam	CL	A-6	0	0-5	90-100	85-100	80-95	70-80	30-40	10-20
	31-60	Clay loam	CL	A-6	0	0-5	90-100	85-100	80-95	70-80	30-40	10-20
Elloam-----	0-7	Clay loam	CL	A-6	0	0-5	95-100	80-100	70-100	55-80	30-40	10-15
	7-12	Clay loam, clay	CL	A-6,	0	0-5	95-100	80-100	70-100	55-90	35-50	15-30
				A-7								
	12-18	Clay loam, clay	CL	A-6,	0	0-5	95-100	80-100	65-100	50-80	30-45	10-20
				A-7								
	18-60	Clay loam, loam	CL	A-7,	0	0-5	95-100	80-100	65-100	50-80	30-45	10-20
				A-6								

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid	Plas-
			Unified	AASHTO	>10	3-10	4	10	40	200	limit	ticity
					inches	inches						
	In				Pct	Pct					Pct	
444D:												
Kevin-----	0-6	Clay loam	CL	A-6	0	0-5	90-100	85-100	80-95	70-80	25-40	10-20
	6-9	Clay loam, clay	CL	A-6,	0	0-5	90-100	85-100	80-95	70-80	35-50	15-25
				A-7								
	9-31	Clay loam	CL	A-6	0	0-5	90-100	85-100	80-95	70-80	30-40	10-20
	31-60	Clay loam	CL	A-6	0	0-5	90-100	85-100	80-95	70-80	30-40	10-20
Scobey-----	0-6	Clay loam	CL	A-6	0	0-5	85-100	75-95	70-90	65-80	25-40	10-20
	6-15	Clay, clay loam	CL	A-7,	0	0-5	85-100	85-95	80-95	65-90	35-50	15-30
				A-6								
	15-60	Clay loam	CL	A-6,	0	0-5	85-100	75-95	70-90	65-80	35-45	15-25
				A-7								
451C:												
Turner-----	0-4	Loam	CL-ML	A-4	0	0-10	80-100	75-100	65-95	50-75	25-30	5-10
	4-16	Clay loam, loam	CL	A-6	0	0-10	65-100	60-100	55-90	35-70	30-40	10-20
	16-34	Loam, clay	CL,	A-6	0	0-10	65-100	60-100	55-95	40-75	30-40	10-15
		loam, gravelly	GC, SC									
		loam										
	34-60	Extremely	GP,	A-1	0	10-30	25-60	15-50	10-35	0-15	---	NP
		gravelly loamy	GM, GP-									
		sand, very	GM									
		gravelly sand,										
		extremely										
		gravelly sand										
Beaverton-----	0-4	Very cobbly	GM, SM	A-2,	0	30-45	60-75	55-70	40-60	20-40	20-25	NP-5
		loam		A-4,								
				A-1								
	4-15	Very cobbly	GC,	A-2,	0	20-40	45-70	40-60	35-55	20-40	25-35	5-15
		clay loam,	SC, GM-	A-4,								
		very cobbly	GC, SC-	A-6								
		sandy clay	SM									
		loam, very										
		gravelly clay										
		loam										
	15-60	Extremely	GM,	A-1	0	25-50	30-75	20-65	10-50	5-15	---	NP
		cobbly loamy	SM, SP-									
		sand,	SM, GP-									
		extremely	GM									
		gravelly sand,										
		very cobbly										
		loamy sand										
Beaverton-----	0-5	Gravelly loam	CL-ML,	A-4,	0	0-10	65-80	60-75	50-70	30-60	25-30	5-10
			SC-SM,	A-2								
			GM-GC									
	5-18	Very gravelly	GM-GC,	A-4,	0	0-25	40-55	35-50	30-45	20-40	25-35	5-15
		clay loam,	GC	A-2,								
		very gravelly		A-6								
</												

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
460:												
Laceycreek-----	0-18	Loam	CL-ML	A-4	0	0-5	90-100	80-100	75-95	55-75	25-30	5-10
	18-26	Loam, clay loam	CL	A-6	0	0-5	90-100	85-100	70-95	50-80	30-35	10-15
	26-44	Clay loam, sandy clay loam, gravelly loam	CL-ML, CL, SC SM, SC	A-4, A-6	0	0-5	85-100	75-100	60-95	35-70	25-35	5-15
	44-60	Loam, sandy loam, gravelly sandy loam	SC-SM, CL-ML, SM, ML	A-2, A-4	0	0-5	80-100	70-100	40-70	25-60	20-30	NP-10
471B:												
Marias-----	0-6	Silty clay	CL, CH	A-7	0	0	100	100	95-100	90-95	40-60	20-40
	6-38	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-95	40-70	25-50
	38-60	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-95	40-70	25-50
Kobase-----	0-6	Silty clay loam	CL	A-7, A-6	0	0	95-100	90-100	85-100	80-95	30-45	10-20
	6-25	Silty clay loam, silty clay, clay	CL A-6	A-7, A-6	0	0	95-100	90-100	85-100	75-95	35-50	15-25
	25-60	Silty clay loam, silty clay, clay	CL A-6	A-7, A-6	0	0	95-100	90-100	85-100	75-95	35-50	15-25
481A:												
Bigsag-----	0-4	Silty clay	CL, CH	A-7	0	0	100	100	95-100	90-95	40-60	20-40
	4-15	Silty clay, clay, silty clay loam	CL, CH	A-7	0	0	100	100	90-100	75-95	40-60	20-40
	15-60	Silty clay, clay, silty clay loam	CL, CH	A-7	0	0	100	100	90-100	75-95	40-60	20-40
493A:												
Enbar-----	0-18	Loam	CL-ML	A-4	0	0	80-100	75-100	60-85	50-75	20-30	5-10
	18-30	Stratified silt loam to clay loam	CL-ML	A-4	0	0	80-100	75-100	65-90	55-80	20-30	5-10
	30-52	Stratified sandy loam to silty clay loam	CL-ML, ML	A-4	0	0	80-100	75-100	60-85	50-75	20-30	NP-10
	52-60	Very gravelly sandy loam, very gravelly loamy sand, extremely gravelly sandy loam	GM, GP GM	A-2, A-1	0	0-10	25-60	15-50	10-40	5-30	15-25	NP-5
Straw-----	0-8	Loam	CL-ML	A-4	0	0	100	100	80-100	60-85	25-30	5-10
	8-60	Loam, silty clay loam, clay loam	CL-ML, CL	A-6, A-4	0	0	100	100	80-100	60-85	25-35	5-15

[illegible]

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4 10 40 200					
	In				Pct	Pct					Pct	
511A:												
Martinsdale-----	0-4	Loam	CL-ML	A-4	0	0-5	85-100	80-100	70-85	50-75	25-30	5-10
	4-18	Clay loam, loam	CL	A-6	0	0-5	85-100	80-100	65-90	40-70	30-35	10-15
	18-40	Sandy clay	CL, CL-	A-4,	0	0-5	85-100	80-100	60-90	35-70	25-35	5-15
		loam, clay	ML, SC-	A-6								
		loam, loam	SM, SC									
	40-60	Gravelly loam,	SM, GM	A-4,	0	0-10	45-80	35-70	25-60	15-50	25-35	NP-10
		gravelly sandy		A-2,								
		clay loam,		A-1								
		very gravelly										
		sandy loam										
Turner-----	0-4	Loam	CL-ML	A-4	0	0-10	80-100	75-100	65-95	50-75	25-30	5-10
	4-16	Clay loam, loam	CL	A-6	0	0-10	65-100	60-100	55-90	35-70	30-40	10-20
	16-34	Loam, clay	CL,	A-6	0	0-10	65-100	60-100	55-95	40-75	30-40	10-15
		loam, gravelly	GC, SC									
		loam										
	34-60	Extremely	GP,	A-1	0	10-30	25-60	15-50	10-35	0-15	---	NP
		gravelly loamy	GM, GP-									
		sand, very	GM									
		gravelly sand,										
		extremely										
		gravelly sand										
511C:												
Martinsdale-----	0-4	Loam	CL-ML	A-4	0	0-5	85-100	80-100	70-85	50-75	25-30	5-10
	4-18	Clay loam, loam	CL	A-6	0	0-5	85-100	80-100	65-90	40-70	30-35	10-15
	18-40	Sandy clay	CL, CL-	A-4,	0	0-5	85-100	80-100	60-90	35-70	25-35	5-15
		loam, clay	ML, SC-	A-6								
		loam, loam	SM, SC									
	40-60	Gravelly loam,	SM, GM	A-4,	0	0-10	45-80	35-70	25-60	15-50	25-35	NP-10
		sandy clay		A-2,								
		loam, very		A-1								
		gravelly sandy										
		loam										
512C:												
Martinsdale-----	0-8	Stony loam	CL-ML	A-4	15-25	10-15	85-100	80-100	70-95	50-75	25-30	5-10
	8-20	Clay loam, loam	CL	A-6	0	0-5	85-100	80-100	65-95	40-70	25-35	10-15
	20-42	Clay loam, loam	CL-ML,	A-4,	0	0-5	85-100	80-100	60-95	35-70	25-35	5-15
			CL, SC-	A-6								
			SM, SC									
	42-60	Gravelly sandy	GM, SC-	A-4,	0	0-10	40-90	35-80	25-70	15-50	20-30	NP-10
		loam, very	SM,	A-2								
		gravelly sandy	SM, GM-									
		clay loam, loam	GC									
521B:												
Thoeny-----	0-6	Loam	CL	A-6	0	0-5	95-100	85-95	85-95	65-75	25-35	10-15
	6-14	Clay, clay loam	CL, CH	A-6,	0	0-5	95-100	85-95	85-95	75-95	35-55	15-30
				A-7								
	14-34	Clay loam, clay	CL, CH	A-6,	0	0-5	95-100	85-95	85-95	70-80	35-55	15-30
				A-7								
	34-60	Clay loam	CL	A-6,	0	0-5	95-100	85-95	85-95	70-80	30-45	15-25
				A-7								

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10						
					inches	inches	4	10	40	200		
	In				Pct	Pct					Pct	
521B: (cont.)												
Elloam-----	0-7	Clay loam	CL	A-6	0	0-5	95-100	80-100	70-100	55-80	30-40	10-15
	7-12	Clay loam, clay	CL	A-6, A-7	0	0-5	95-100	80-100	70-100	55-90	35-50	15-30
	12-18	Clay loam, clay	CL	A-6, A-7	0	0-5	95-100	80-100	65-100	50-80	30-45	10-20
	18-60	Clay loam, loam	CL	A-7, A-6	0	0-5	95-100	80-100	65-100	50-80	30-45	10-20
Absher-----	0-7	Clay	CL, CH	A-7	0	0	95-100	75-100	70-100	60-95	40-60	20-35
	7-11	Silty clay, clay, clay loam	CL, CH	A-7	0	0	95-100	75-100	70-100	60-95	40-60	20-40
	11-60	Clay loam, silty clay loam, silty clay	CL, CH	A-7	0	0	95-100	75-100	70-100	60-95	40-55	20-35
530F:												
Warwood-----	0-4	Loam	CL-ML	A-4	0	0-5	85-100	80-95	70-80	50-70	25-30	5-10
	4-8	Loam, sandy loam	CL-ML, SC-SM	A-4, A-2	0	0-5	85-100	80-95	50-80	30-60	25-30	5-10
	8-15	Sandy clay loam, clay loam	CL-ML, CL, SC-	A-4, A-6	0	0-5	85-100	80-95	65-90	35-65	25-35	5-15
			SM, SC									
	15-24	Clay loam, gravelly clay loam	CL	A-6	0	0-10	75-95	70-90	65-85	50-70	30-35	10-15
	24-60	Clay loam, sandy clay loam, gravelly sandy clay loam	CL-ML, CL, SC- SM, SC	A-4, A-6	0	0-10	70-95	65-90	60-85	30-70	25-35	5-15
531A:												
Sweetgrass-----	0-6	Clay loam	CL	A-6	0	0-10	90-100	85-100	60-80	55-75	30-35	10-15
	6-18	Clay loam, clay	CL	A-6, A-7	0	0-10	90-100	85-100	65-85	60-80	35-45	15-25
	18-25	Gravelly loam, gravelly sandy clay loam, gravelly sandy loam	SC, GC, SC- SM, GM- GC	A-4, A-6, A-2	0	0-15	65-85	60-80	35-55	30-50	25-35	5-15
	25-60	Extremely gravelly coarse sand, extremely gravelly loamy sand	GP-GM	A-1	0	25-30	30-40	20-35	10-20	5-10	20-30	NP-5
Beaverton-----	0-4	Very cobbly loam	GM, SM	A-2, A-4, A-1	0	30-45	60-75	55-70	40-60	20-40	20-25	NP-5
	4-15	Very cobbly clay loam, very cobbly sandy clay loam, very gravelly clay loam	GC, SM- SC, GM- GC, SC- SM	A-2, A-4, A-6	0	20-40	45-70	40-60	35-55	20-40	25-35	5-15

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
531A: (cont.) Beaverton (cont.)	15-60	Extremely cobbley loamy sand, extremely gravelly sand, very cobbly loamy sand	GM, SM, SP- SM, GP- GM	A-1	0	25-50	30-75	20-65	10-50	5-15	---	NP
531C: Sweetgrass-----	0-6	Clay loam	CL	A-6	0	0-10	90-100	85-100	60-80	55-75	30-35	10-15
	6-18	Clay loam, clay	CL	A-6, A-7	0	0-10	90-100	85-100	65-85	60-80	35-45	15-25
	18-25	Gravelly loam, gravelly sandy loam, gravelly sandy clay loam	SC, GC, SC- SM, GM- GC	A-4, A-6, A-2	0	0-15	65-85	60-80	35-55	30-50	25-35	5-15
	25-60	Extremely gravelly coarse sand, extremely gravelly loamy sand	GP-GM	A-1	0	25-30	30-40	20-35	10-20	5-10	20-30	NP-5
Beaverton-----	0-4	Very cobbly loam	GM, SM	A-2, A-4, A-1	0	30-45	60-75	55-70	40-60	20-40	20-25	NP-5
	4-15	Very cobbly clay loam, very cobbly sandy clay loam, very gravelly clay loam	GC, SC, GM- GC, SC- SM	A-2, A-4, A-6	0	20-40	45-70	40-60	35-55	20-40	25-35	5-15
	15-60	Extremely cobbley loamy sand, extremely gravelly sand, very cobbly loamy sand	GM, SM, SP- SM, GP- GM	A-1	0	25-50	30-75	20-65	10-50	5-15	---	NP
Beaverton-----	0-5	Gravelly loam	CL-ML, SC-SM, GM-GC	A-4, A-2	0	0-10	65-80	60-75	50-70	30-60	25-30	5-10
	5-18	Very gravelly clay loam, very gravelly sandy clay loam	GM-GC, GC	A-4, A-2, A-6	0	0-25	40-55	35-50	30-45	20-40	25-35	5-15
	18-60	Extremely gravelly loamy sand, extremely gravelly sand, very gravelly loamy sand	GM, GP, GP- GM, SM	A-1	0	0-30	25-60	15-50	10-35	0-15	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
550F: Libeg-----	0-8	Cobbly loam	ML, CL- ML, SM, SC- SM	A-4	0	15-30	75-95	70-90	60-80	45-70	20-30	NP-10
	8-14	Very channery loam, very channery clay loam, extremely cobbly clay loam	GM-GC, GC, SC- SM, SC	A-2, A-4, A-6	0	30-65	35-80	30-70	20-55	15-50	20-35	5-15
	14-48	Very cobbly sandy clay loam, very channery clay loam	GM-GC, GC	A-2, A-4, A-6	0	10-65	40-60	30-50	20-45	15-40	25-35	5-15
	48-60	Extremely cobbly sandy loam, very cobbly sandy loam, extremely channery loam	GM-GC, GM	A-1, A-2	0	15-65	30-60	20-50	15-40	10-30	20-30	NP-10
Arrowpeak-----	0-8	Very cobbly loam	GM	A-2, A-4	0-5	25-45	55-70	45-60	40-55	25-45	20-25	NP-5
	8-17	Extremely cobbly loam, extremely cobbly sandy loam, very cobbly loam	GM	A-2, A-1	0-5	40-65	30-60	30-50	15-45	10-30	20-25	NP-5
	17-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Elkner-----	0-5	Sandy loam	SM	A-2, A-4	0	0	80-100	75-100	45-70	25-40	20-30	NP-5
	5-32	Gravelly sandy loam, sandy loam, coarse sandy loam	SM	A-1, A-2	0	0-10	75-100	70-100	35-60	20-35	---	NP
	32-60	Coarse sandy loam, gravelly loamy coarse sand	SM	A-1, A-2	0	0-10	75-100	70-100	30-60	20-35	---	NP
551B: Lonesome-----	0-6	Loamy fine sand	SM	A-2	0	0-2	95-100	95-100	80-90	25-35	15-20	NP-5
	6-32	Loamy fine sand, loamy sand, fine sand	SM	A-2	0	0-2	95-100	95-100	50-90	15-35	15-20	NP-5
	32-60	Clay loam, loam, silty clay loam	CL, CL- ML	A-4, A-6	0	0-5	95-100	95-100	85-100	60-85	25-35	5-15

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
560F: Elve-----	0-18	Very cobbly loam	GM, SM	A-2, A-4	5-15	20-30	50-75	40-65	35-50	30-45	15-25	NP-5
	18-60	Extremely cobbly sandy loam, extremely cobbly loam	GM, GP- GM	A-1	5-10	40-45	25-55	15-45	10-30	5-25	15-25	NP-5
Rock outcrop----												
561B: Scobey-----	0-6	Clay loam	CL	A-6	0	0-5	85-100	75-95	70-90	65-80	25-40	10-20
	6-15	Clay, clay loam	CL	A-7, A-6	0	0-5	85-100	85-95	80-95	65-90	35-50	15-30
	15-60	Clay loam	CL	A-6, A-7	0	0-5	85-100	75-95	70-90	65-80	35-45	15-25
Kevin-----	0-6	Clay loam	CL	A-6	0	0-5	90-100	85-100	80-95	70-80	25-40	10-20
	6-9	Clay loam, clay	CL	A-6, A-7	0	0-5	90-100	85-100	80-95	70-80	35-50	15-25
	9-31	Clay loam	CL	A-6	0	0-5	90-100	85-100	80-95	70-80	30-40	10-20
	31-60	Clay loam	CL	A-6	0	0-5	90-100	85-100	80-95	70-80	30-40	10-20
561C: Scobey-----	0-6	Clay loam	CL	A-6	0	0-5	85-100	75-95	70-90	65-80	25-40	10-20
	6-15	Clay, clay loam	CL	A-7, A-6	0	0-5	85-100	85-95	80-95	65-90	35-50	15-30
	15-60	Clay loam	CL	A-6, A-7	0	0-5	85-100	75-95	70-90	65-80	35-45	15-25
Kevin-----	0-6	Clay loam	CL	A-6	0	0-5	90-100	85-100	80-95	70-80	25-40	10-20
	6-9	Clay loam, clay	CL	A-6, A-7	0	0-5	90-100	85-100	80-95	70-80	35-50	15-25
	9-31	Clay loam	CL	A-6	0	0-5	90-100	85-100	80-95	70-80	30-40	10-20
	31-60	Clay loam	CL	A-6	0	0-5	90-100	85-100	80-95	70-80	30-40	10-20
562B: Scobey-----	0-6	Clay loam	CL	A-6	0	0-5	85-100	75-95	70-90	65-80	25-40	10-20
	6-15	Clay, clay loam	CL	A-7, A-6	0	0-5	85-100	85-95	80-95	65-90	35-50	15-30
	15-60	Clay loam	CL	A-6, A-7	0	0-5	85-100	75-95	70-90	65-80	35-45	15-25
Linnet-----	0-7	Silty clay	CL	A-7	0	0	90-100	85-100	80-100	75-95	40-50	15-25
	7-14	Silty clay, clay	CL, CH	A-7	0	0	90-100	85-100	75-100	60-90	45-65	25-45
	14-36	Silty clay, clay, silty clay loam	CL, CH	A-6, A-7	0	0-5	85-100	80-100	70-100	55-90	35-55	15-35
	36-60	Clay loam, silty clay loam, silty clay	CL, CH	A-6, A-7	0	0-5	85-100	80-100	65-95	50-85	35-55	15-35
563A: Fortbenton-----	0-7	Fine sandy loam	SM	A-4	0	0	100	100	70-85	35-50	15-25	NP-5
	7-24	Fine sandy loam, sandy loam	SM	A-4	0	0	100	100	70-85	35-50	15-25	NP-5
	24-60	Clay loam	CL	A-6	0	0	100	100	80-95	70-95	30-40	10-15

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index		
			Unified	AASHTO	>10 inches	3-10 inches								
							4	10	40	200				
	In				Pct	Pct					Pct			
563A: (cont.)														
Scobey-----	0-7	Fine sandy loam	SM	A-4	0	0	100	100	70-85	40-50	20-25	NP-5		
	7-15	Clay, clay loam	CL	A-7, A-6	0	0-5	85-100	85-95	80-95	65-90	35-50	15-30		
	15-60	Clay loam	CL	A-6, A-7	0	0-5	85-100	75-95	70-90	65-80	35-45	15-25		
580F:														
Garlet-----	0-12	Cobbly loam	SM, SC- SM, ML, CL- ML	A-4	0-5	15-25	75-95	70-90	60-85	35-70	20-30	NP-10		
	12-26	Very cobbly loam, very flaggy loam, extremely channery sandy loam	GM, GM- GC	A-1, A-2	0-5	15-45	35-65	30-60	25-50	15-35	20-30	NP-10		
	26-44	Extremely cobbly loam, extremely flaggy loam, extremely channery sandy loam	GM, GM- GC	A-1, A-2	0-5	25-50	25-60	20-55	15-45	10-30	20-30	NP-10		
	44-60	Extremely cobbly loam, extremely flaggy loam, extremely channery sandy loam	GM, GM- GC	A-1, A-2	0-5	25-50	25-60	20-50	15-45	10-30	15-30	NP-10		
Elkner-----	0-5	Sandy loam	SM	A-2, A-4	0	0	80-100	75-100	45-70	25-40	20-30	NP-5		
	5-32	Gravelly sandy loam, sandy loam, coarse sandy loam	SM	A-1, A-2	0	0-10	75-100	70-100	35-60	20-35	---	NP		
	32-60	Coarse sandy loam, gravelly loamy coarse sand	SM	A-1, A-2	0	0-10	75-100	70-100	30-60	20-35	---	NP		
601A:														
Havre-----	0-6	Loam	CL-ML	A-4	0	0	100	100	80-95	60-90	20-30	5-10		
	6-60	Stratified fine sandy loam to silty clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	80-95	60-80	20-35	5-15		
Glendive-----	0-6	Sandy loam	SM, ML	A-2, A-4	0	0	100	100	65-85	30-55	15-20	NP-5		
	6-29	Loam, sandy loam, fine sandy loam	ML, CL- ML, SC- SM	A-4	0	0	100	100	65-95	40-70	15-25	NP-10		
	29-60	Stratified loamy sand to clay loam	SM, SC- SM	A-2, A-4	0	0	95-100	75-100	60-90	25-50	15-25	NP-10		

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Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
641F: Norbert-----	0-5	Silty clay	CH, CL	A-7	0	0	100	100	90-100	85-95	45-60	25-40
	5-18	Clay, silty clay	CH	A-7	0	0	100	95-100	90-100	80-95	50-65	30-45
	18-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Barkof-----	0-4	Silty clay	CL, CH	A-7	0	0	100	100	90-100	85-95	45-60	20-30
	4-24	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-90	45-65	25-45
	24-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
650D: Laceycreek-----	0-9	Loam	CL-ML	A-4	0	0-5	90-100	80-100	75-95	55-75	25-30	5-10
	9-22	Loam, clay loam	CL	A-6	0	0-5	90-100	85-100	70-95	50-80	30-35	10-15
	22-52	Clay loam, sandy clay loam, gravelly loam	CL-ML, A-4, CL, SC- SM, SC	A-4, A-6	0	0-5	85-100	75-100	60-95	35-70	25-35	5-15
	52-60	Loam, sandy loam, gravelly sandy loam	SC-SM, CL-ML, SM, ML	A-2, A-4	0	0-5	80-100	70-100	40-70	25-60	20-30	NP-10
Ambrant-----	0-4	Sandy loam	SM	A-2, A-4	0	0-5	85-100	75-95	45-65	25-40	20-25	NP-5
	4-21	Coarse sandy loam, gravelly coarse sandy loam	SM	A-1, A-2	0	0-5	70-90	60-85	25-55	10-35	20-25	NP-5
	21-43	Coarse sandy loam, gravelly coarse sandy loam	SM	A-1, A-2	0	0-5	70-90	60-85	25-55	10-35	20-25	NP-5
	43-60	Gravelly loamy coarse sand, gravelly coarse sandy loam, very gravelly loamy sand	GM, SM	A-1	0	0	45-85	35-75	15-50	5-25	---	NP
650F: Laceycreek-----	0-9	Loam	CL-ML	A-4	0	0-5	90-100	80-100	75-95	55-75	25-30	5-10
	9-22	Loam, clay loam	CL	A-6	0	0-5	90-100	85-100	70-95	50-80	30-35	10-15
	22-52	Clay loam, sandy clay loam, gravelly loam	CL-ML, A-4, CL, SC- SM, SC	A-4, A-6	0	0-5	85-100	75-100	60-95	35-70	25-35	5-15
	52-60	Loam, sandy loam, gravelly sandy loam	SC-SM, CL-ML, SM, ML	A-2, A-4	0	0-5	80-100	70-100	40-70	25-60	20-30	NP-10
Eaglecreek-----	0-4	Loam	CL-ML	A-4	0	0-5	85-100	80-100	70-90	50-70	20-30	5-10
	4-10	Loam, sandy loam	CL-ML, SC-SM	A-4	0	0-5	85-100	80-100	55-75	35-60	20-30	5-10

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Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
661E: (cont.)												
Fleak-----	0-3	Loamy fine sand	SM	A-2	0	0-5	95-100	95-100	70-90	20-35	---	NP
	3-18	Fine sand, loamy fine sand	SM	A-2	0	0-5	95-100	95-100	70-85	20-35	---	NP
	18-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
671B:												
Bearpaw-----	0-6	Clay loam	CL	A-6, A-7	0	0-5	85-100	80-100	70-100	55-80	30-45	10-20
	6-16	Clay loam, clay	CL, CH	A-7	0	0-5	85-100	80-100	70-100	60-90	40-65	15-40
	16-34	Clay loam, clay	CL, CH	A-6, A-7	0	0-5	85-100	80-100	70-100	55-85	35-60	15-35
	34-60	Clay loam, clay	CL, CH	A-6, A-7	0	0-5	85-100	80-100	70-100	55-85	35-60	15-35
Vida-----	0-5	Clay loam	CL	A-6	0	0-10	90-100	85-100	75-95	60-80	25-35	10-15
	5-15	Clay loam, loam	CL	A-6	0	0-10	90-100	85-100	70-95	50-85	30-40	10-20
	15-60	Clay loam, loam	CL	A-6	0	0-10	90-100	85-100	70-95	50-80	25-40	10-20
671C:												
Bearpaw-----	0-6	Clay loam	CL	A-6, A-7	0	0-5	85-100	80-100	70-100	55-80	30-45	10-20
	6-16	Clay loam, clay	CL, CH	A-7	0	0-5	85-100	80-100	70-100	60-90	40-65	15-40
	16-34	Clay loam, clay	CL, CH	A-6, A-7	0	0-5	85-100	80-100	70-100	55-85	35-60	15-35
	34-60	Clay loam, clay	CL, CH	A-6, A-7	0	0-5	85-100	80-100	70-100	55-85	35-60	15-35
Vida-----	0-5	Clay loam	CL	A-6	0	0-10	90-100	85-100	75-95	60-80	25-35	10-15
	5-15	Clay loam, loam	CL	A-6	0	0-10	90-100	85-100	70-95	50-85	30-40	10-20
	15-60	Clay loam, loam	CL	A-6	0	0-10	90-100	85-100	70-95	50-80	25-40	10-20
673A:												
Bearpaw-----	0-6	Clay loam	CL	A-6, A-7	0	0-5	85-100	80-100	70-100	55-80	30-45	10-20
	6-16	Clay loam, clay	CL, CH	A-7	0	0-5	85-100	80-100	70-100	60-90	40-65	15-40
	16-34	Clay loam, clay	CL, CH	A-6, A-7	0	0-5	85-100	80-100	70-100	55-85	35-60	15-35
	34-60	Clay loam, clay	CL, CH	A-6, A-7	0	0-5	85-100	80-100	70-100	55-85	35-60	15-35
Daglum-----	0-12	Loam	CL-ML	A-4	0	0-5	85-100	80-100	70-95	50-75	25-30	5-10
	12-20	Clay, clay loam	CL, CH	A-7	0	0-5	85-100	80-100	70-100	60-90	40-65	20-40
	20-60	Clay, clay loam	CL, CH	A-7	0	0-5	85-100	80-100	70-100	60-90	40-65	20-40
674B:												
Bearpaw-----	0-6	Clay loam	CL	A-6, A-7	0	0-5	85-100	80-100	70-100	55-80	30-45	10-20
	6-16	Clay loam, clay	CL, CH	A-7	0	0-5	85-100	80-100	70-100	60-90	40-65	15-40
	16-34	Clay loam, clay	CL, CH	A-6, A-7	0	0-5	85-100	80-100	70-100	55-85	35-60	15-35
	34-60	Clay loam, clay	CL, CH	A-6, A-7	0	0-5	85-100	80-100	70-100	55-85	35-60	15-35
Waltham-----	0-6	Clay loam	CL	A-6	0	0	90-100	90-100	80-100	65-80	30-48	15-20
	6-11	Clay	CL, CH	A-7	0	0	90-100	90-100	80-100	65-95	45-60	25-35
	11-18	Clay loam, clay	CL	A-6, A-7	0	0	90-100	90-100	80-100	65-90	35-45	15-20
	18-60	Clay loam	CL	A-6, A-7	0	0	90-100	90-100	80-100	65-90	35-45	15-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
680F: Winkler-----	0-10	Gravelly sandy loam	SM, GM	A-1, A-2	0	0-5	60-80	55-75	35-60	15-30	15-25	NP-5
	10-18	Very gravelly sandy loam, extremely gravelly sandy loam, very gravelly loam	GM, GP- GM, SP- SM	A-1	0	0-15	25-60	15-50	10-35	5-20	15-25	NP-5
	18-36	Extremely gravelly sandy loam, extremely gravelly loam	GM, GP- GM	A-1	0	15-40	20-40	10-30	10-25	5-20	15-25	NP-5
	36-60	Extremely gravelly sandy loam, extremely gravelly loam	GP-GM	A-1	0	15-40	20-40	10-30	10-25	5-10	15-25	NP-5
Ambrant-----	0-4	Sandy loam	SM	A-2, A-4	0	0-5	85-100	75-95	45-65	25-40	20-25	NP-5
	4-21	Coarse sandy loam, gravelly coarse sandy loam	SM	A-1, A-2	0	0-5	70-90	60-85	25-55	10-35	20-25	NP-5
	21-43	Coarse sandy loam, gravelly coarse sandy loam	SM	A-1, A-2	0	0-5	70-90	60-85	25-55	10-35	20-25	NP-5
	43-60	Gravelly loamy coarse sand, gravelly coarse sandy loam, very gravelly loamy sand	GM, SM	A-1	0	0	45-85	35-75	15-50	5-25	---	NP
Winkler-----	0-10	Gravelly sandy loam	SM, GM	A-1, A-2	0	0-5	60-80	55-75	35-60	15-30	15-25	NP-5
	10-18	Very gravelly sandy loam, extremely gravelly sandy loam, very gravelly loam	GM, GP- GM, SP- SM	A-1	0	0-15	25-60	15-50	10-35	5-20	15-25	NP-5
	18-36	Extremely gravelly sandy loam, extremely gravelly loam	GM, GP- GM	A-1	0	15-40	20-40	10-30	10-25	5-20	15-25	NP-5
	36-60	Extremely gravelly sandy loam, extremely gravelly loam	GP-GM	A-1	0	15-40	20-40	10-30	10-25	5-10	15-25	NP-5

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index			
			Unified	AASHTO	>10 inches	3-10 inches	4						10	40	200
	In				Pct	Pct					Pct				
681C:															
Gerber-----	0-6	Clay	CL, CH	A-7	0	0	100	95-100	90-100	80-95	40-55	15-30			
	6-14	Silty clay, clay	CL, CH	A-7	0	0	100	95-100	85-100	75-95	40-65	20-45			
	14-30	Clay, silty clay, clay loam	CL, CH	A-7, A-6	0	0	95-100	90-100	85-100	75-95	35-55	15-35			
	30-60	Clay loam, silty clay, clay	CL, CH	A-7, A-6	0	0	95-100	90-100	80-100	65-95	35-55	15-35			
691D:															
Vida-----	0-5	Loam	CL-ML	A-4	0	0-10	90-100	85-95	70-90	55-75	20-30	5-10			
	5-34	Clay loam, loam	CL	A-6	0	0-10	90-100	85-100	70-95	50-85	30-40	10-20			
	34-60	Clay loam, loam	CL	A-6	0	0-10	90-100	85-100	70-95	50-80	25-40	10-20			
Williams-----	0-5	Loam	CL-ML, CL	A-4	0	0-5	95-100	85-100	85-95	75-90	20-30	5-10			
	5-16	Clay loam, loam	CL-ML, CL	A-4, A-6	0	0-5	95-100	85-100	80-95	70-90	25-35	5-15			
	16-60	Clay loam, loam	CL-ML, CL	A-4, A-6	0	0-5	85-100	75-100	65-80	55-70	25-35	5-15			
692D:															
Vida-----	0-5	Clay loam	CL	A-6	0	0-10	90-100	85-100	75-95	60-80	25-35	10-15			
	5-15	Clay loam	CL	A-6	0	0-10	90-100	85-100	70-95	50-85	30-40	10-20			
	15-60	Clay loam	CL	A-6	0	0-10	90-100	85-100	70-95	50-80	25-40	10-20			
Bearpaw-----	0-6	Clay loam	CL	A-6, A-7	0	0-5	85-100	80-100	70-100	55-80	30-45	10-20			
	6-16	Clay loam, clay	CL, CH	A-7	0	0-5	85-100	80-100	70-100	60-90	40-65	15-40			
	16-34	Clay loam, clay	CL, CH	A-6, A-7	0	0-5	85-100	80-100	70-100	55-85	35-60	15-35			
	34-60	Clay loam, clay	CL, CH	A-6, A-7	0	0-5	85-100	80-100	70-100	55-85	35-60	15-35			
693C:															
Vida-----	0-5	Clay loam	CL	A-6	0	0-10	90-100	85-100	75-95	60-80	25-35	10-15			
	5-15	Clay loam	CL	A-6	0	0-10	90-100	85-100	70-95	50-85	30-40	10-20			
	15-60	Clay loam	CL	A-6	0	0-10	90-100	85-100	70-95	50-80	25-40	10-20			
Bearpaw-----	0-6	Clay loam	CL	A-6, A-7	0	0-5	85-100	80-100	70-100	55-80	30-45	10-20			
	6-16	Clay loam, clay	CL, CH	A-7	0	0-5	85-100	80-100	70-100	60-90	40-65	15-40			
	16-34	Clay loam, clay	CL, CH	A-6, A-7	0	0-5	85-100	80-100	70-100	55-85	35-60	15-35			
	34-60	Clay loam, clay	CL, CH	A-6, A-7	0	0-5	85-100	80-100	70-100	55-85	35-60	15-35			
Nishon-----	0-8	Clay loam	CL	A-6, A-7	0	0	100	100	85-100	60-85	30-45	10-20			
	8-31	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-95	40-65	20-45			
	31-60	Clay, silty clay, clay loam	CL, CH	A-6, A-7	0	0	90-100	90-100	80-100	65-90	35-60	15-40			

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4 10 40 200					
	In				Pct	Pct					Pct	
701E:												
Work-----	0-6	Clay loam	CL	A-6	0	0-5	90-100	80-100	70-90	60-80	30-40	10-20
	6-22	Clay, clay loam	CL, CH	A-7, A-6	0	0-5	90-100	80-100	70-95	60-85	30-55	10-30
	22-48	Clay loam, loam	CL, CL- ML	A-4, A-6, A-7	0	0-5	90-100	80-100	65-90	55-80	25-45	5-20
	48-60	Gravelly clay loam, gravelly loam, clay loam	CL, CL- ML, GC, SC	A-4, A-6, A-7	0	0-10	60-100	55-100	50-95	35-75	25-45	5-20
Absarokee-----	0-7	Clay loam	CL-ML, CL	A-4, A-6	0	0-5	95-100	90-100	70-95	70-90	25-40	5-15
	7-18	Clay, clay loam	CL, CH	A-7, A-6	0	0-5	95-100	90-100	75-100	70-90	35-55	15-30
	18-34	Clay loam, channery clay loam	CL, GC, SC	A-6, A-7	0	0-10	60-100	55-95	40-80	35-75	30-45	10-20
	34-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
702E:												
Work-----	0-6	Stony loam	CL-ML, GM-GC, SC-SM	A-4	0	10-25	70-90	65-85	55-80	40-65	25-30	5-10
	6-22	Clay, clay loam	CL, CH	A-6, A-7	0	0-5	85-100	80-100	70-95	55-80	35-55	15-30
	22-48	Clay loam, loam	CL	A-6, A-7	0	0-5	85-100	80-100	70-95	50-75	30-45	10-20
	48-60	Gravelly clay loam, gravelly loam, clay loam	CL-ML, CL, GM- GC, GC	A-4, A-6, A-7	0	0-10	60-90	55-85	50-80	35-65	25-45	5-20
Absarokee-----	0-7	Stony loam	ML, CL- ML	A-4	0	25-40	90-100	80-95	70-90	55-75	25-35	5-10
	7-18	Clay, clay loam	CL, CH	A-7, A-6	0	0-5	95-100	90-100	75-100	70-90	35-55	15-30
	18-34	Clay loam, channery clay loam	CL, GC, SC	A-6, A-7	0	0-10	60-100	55-95	40-80	35-75	30-45	10-20
	34-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
721E:												
Zahill-----	0-3	Clay loam	CL, CL- ML	A-6, A-4	0	0-10	90-100	85-100	85-95	70-80	25-40	5-15
	3-18	Clay loam, loam	CL, CL- ML	A-4, A-6	0	0-10	90-100	85-100	80-95	60-80	25-40	5-15
	18-60	Clay loam, loam	CL, CL- ML	A-4, A-6	0	0-10	90-100	85-100	80-95	60-80	25-40	5-15
Vida-----	0-5	Clay loam	CL	A-6	0	0-10	90-100	85-100	75-95	60-80	25-35	10-15
	5-15	Clay loam, loam	CL	A-6	0	0-10	90-100	85-100	70-95	50-85	30-40	10-20
	15-60	Clay loam, loam	CL	A-6	0	0-10	90-100	85-100	70-95	50-80	25-40	10-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
722F: Zahill-----	0-3	Clay loam	CL, CL- ML	A-6, A-4	0	0-10	90-100	85-100	85-95	70-80	25-40	5-15
	3-18	Clay loam, loam	CL, CL- ML	A-4, A-6	0	0-10	90-100	85-100	80-95	60-80	25-40	5-15
	18-60	Clay loam, loam	CL, CL- ML	A-4, A-6	0	0-10	90-100	85-100	80-95	60-80	25-40	5-15
Sagedale-----	0-4	Silty clay loam	CL	A-6	0	0	100	100	95-100	85-95	30-40	10-20
	4-15	Silty clay loam, silty clay	CL	A-6, A-7	0	0	75-100	70-100	65-100	60-95	35-45	15-25
	15-30	Silty clay loam, silty clay	CL	A-6, A-7	0	0	75-100	70-100	65-100	60-95	35-45	15-25
	30-60	Silty clay loam, silty clay	CL	A-6, A-7	0	0	75-100	70-100	65-100	60-95	35-45	15-25
Wayden-----	0-3	Silty clay loam	CL	A-6, A-7	0	0	100	100	90-100	75-85	35-45	15-25
	3-18	Clay loam, silty clay, silty clay loam	CH, CL	A-7, A-6	0	0	100	100	90-100	80-95	35-60	15-35
	18-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
723F: Zahill-----	0-3	Clay loam	CL, CL- ML	A-6, A-4	0	0-10	90-100	85-100	85-95	70-80	25-40	5-15
	3-18	Clay loam, loam	CL, CL- ML	A-4, A-6	0	0-10	90-100	85-100	80-95	60-80	25-40	5-15
	18-60	Clay loam, loam	CL, CL- ML	A-4, A-6	0	0-10	90-100	85-100	80-95	60-80	25-40	5-15
Cabba-----	0-3	Loam	ML, CL- ML	A-4	0	0-5	90-100	85-100	70-90	60-80	20-30	NP-10
	3-15	Clay loam, silty clay loam, loam	CL, CL- ML	A-6, A-4	0	0-5	95-100	90-100	85-100	80-95	25-35	5-15
	15-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
731F: Yetull-----	0-5	Fine sand	SM	A-2	0	0-5	95-100	95-100	50-75	10-30	---	NP
	5-60	Fine sand, loamy sand, loamy fine sand	SM, SP- SM	A-1, A-3, A-2	0	0-5	95-100	95-100	45-70	5-30	---	NP
Dune land-----												
741B: Shambo-----	0-6	Loam	CL-ML	A-4	0	0	100	100	85-100	65-90	25-30	5-10
	6-15	Loam, clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	85-100	65-90	25-35	5-15
	15-60	Loam, clay loam, silty clay loam	CL-ML, CL	A-6, A-4	0	0	100	100	90-100	65-95	25-35	5-15

[illegible]

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
761E:												
Hedoes-----	0-5	Loam	ML, SM	A-4	0	0-15	85-100	75-100	65-95	45-75	25-35	NP-5
	5-20	Loam, sandy loam	ML, SM	A-4	0	0-15	90-100	85-100	65-95	45-75	25-35	NP-5
	20-31	Coarse sandy loam, gravelly sandy loam, sandy loam	SM	A-1, A-2	0	0-15	85-95	30-60	45-60	10-25	---	NP
	31-60	Very gravelly coarse sandy loam, gravelly sandy loam	GM, SM	A-1	0	0-15	45-65	30-55	15-35	10-20	---	NP
Belain-----	0-6	Loam	ML, CL	A-4	0	0-5	95-100	85-100	65-95	50-75	20-30	NP-10
	6-18	Sandy loam, loam, gravelly loam	ML, SM, CL- ML, SC- SM	A-4	0	0-5	75-100	65-95	50-80	35-65	20-30	NP-10
	18-26	Gravelly sandy loam, gravelly loam	ML, SM, CL- ML, SC- SM	A-2, A-4, A-1	0	0-5	65-85	55-75	35-70	20-55	20-30	NP-10
	26-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
793B:												
Yamacall-----	0-5	Clay loam	CL	A-6	0	0-5	85-100	80-100	65-90	60-80	30-35	10-15
	5-38	Loam, clay loam	CL-ML, CL	A-4, A-6	0	0-5	85-100	80-100	60-85	55-75	25-35	5-15
	38-60	Loam, fine sandy loam, clay loam	CL-ML, SM	A-4, A-2	0	0-5	75-100	70-100	50-80	25-55	15-25	NP-10
793C:												
Yamacall-----	0-5	Clay loam	CL	A-6	0	0-5	85-100	80-100	65-90	60-80	30-35	10-15
	5-38	Loam, clay loam	CL-ML, CL	A-4, A-6	0	0-5	85-100	80-100	60-85	55-75	25-35	5-15
	38-60	Loam, fine sandy loam, clay loam	CL-ML, SM	A-4, A-2	0	0-5	75-100	70-100	50-80	25-55	15-25	NP-10
795C:												
Yamacall-----	0-5	Clay loam	CL	A-6	0	0-5	85-100	80-100	65-90	60-80	30-35	10-15
	5-38	Loam, clay loam	CL-ML, CL	A-4, A-6	0	0-5	85-100	80-100	60-85	55-75	25-35	5-15
	38-60	Loam, fine sandy loam, clay loam	CL-ML, SM	A-4, A-2	0	0-5	75-100	70-100	50-80	25-55	15-25	NP-10
Benz-----	0-7	Clay loam	CL	A-6	0	0	100	100	90-100	70-80	30-35	10-15
	7-60	Stratified silty clay loam to sandy loam	CL-ML, CL	A-4, A-6	0	0	100	100	80-95	50-75	25-35	5-15

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid	Plas-
			Unified	AASHTO	>10	3-10	4	10	40	200	limit	ticity
					inches	inches						
	In				Pct	Pct					Pct	
795D:												
Yamacall-----	0-5	Clay loam	CL	A-6	0	0-5	85-100	80-100	65-90	60-80	30-35	10-15
	5-38	Loam, clay loam	CL-ML,	A-4,	0	0-5	85-100	80-100	60-85	55-75	25-35	5-15
			CL	A-6								
	38-60	Loam, fine sandy loam, clay loam	CL-ML, SM	A-4, A-2	0	0-5	75-100	70-100	50-80	25-55	15-25	NP-10
Benz-----	0-7	Clay loam	CL	A-6	0	0	100	100	90-100	70-80	30-35	10-15
	7-60	Stratified silty clay loam to sandy loam	CL-ML, CL	A-4, A-6	0	0	100	100	80-95	50-75	25-35	5-15
801B:												
Williams-----	0-5	Loam	CL-ML,	A-4	0	0-5	95-100	85-100	85-95	75-90	20-30	5-10
			CL									
	5-16	Clay loam, loam	CL-ML,	A-4,	0	0-5	95-100	85-100	80-95	70-90	25-35	5-15
			CL	A-6								
	16-60	Clay loam, loam	CL-ML,	A-4,	0	0-5	85-100	75-100	65-80	55-70	25-35	5-15
			CL	A-6								
Vida-----	0-5	Loam	CL-ML	A-4	0	0-10	90-100	85-95	70-90	55-75	20-30	5-10
	5-34	Clay loam, loam	CL	A-6	0	0-10	90-100	85-100	70-95	50-85	30-40	10-20
	34-60	Clay loam, loam	CL	A-6	0	0-10	90-100	85-100	70-95	50-80	25-40	10-20
801C:												
Williams-----	0-5	Loam	CL-ML,	A-4	0	0-5	95-100	85-100	85-95	75-90	20-30	5-10
			CL									
	5-16	Clay loam, loam	CL-ML,	A-4,	0	0-5	95-100	85-100	80-95	70-90	25-35	5-15
			CL	A-6								
	16-60	Clay loam, loam	CL-ML,	A-4,	0	0-5	85-100	75-100	65-80	55-70	25-35	5-15
			CL	A-6								
Vida-----	0-5	Loam	CL-ML	A-4	0	0-10	90-100	85-95	70-90	55-75	20-30	5-10
	5-34	Clay loam, loam	CL	A-6	0	0-10	90-100	85-100	70-95	50-85	30-40	10-20
	34-60	Clay loam, loam	CL	A-6	0	0-10	90-100	85-100	70-95	50-80	25-40	10-20
828A:												
Savage-----	0-6	Loam	CL-ML	A-4	0	0	95-100	95-100	80-100	60-80	20-30	5-10
	6-28	Clay, silty clay loam	CL	A-7,	0	0	95-100	95-100	85-100	75-95	35-50	15-30
				A-6								
	28-60	Silty clay, silty clay loam, clay	CL	A-7,	0	0-5	90-100	85-100	75-100	65-95	30-50	10-30
				A-6								
842A:												
Savage-----	0-6	Silty clay loam	CL	A-6	0	0	100	100	90-100	70-90	30-40	10-15
	6-22	Clay, silty clay loam	CL, CH	A-7	0	0	100	100	90-100	75-95	40-60	20-35
	22-36	Silty clay loam, silty clay, clay	CL	A-7,	0	0	95-100	95-100	85-100	70-95	35-50	15-25
				A-6								
	36-60	Silty clay loam, silty clay, clay										

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches						
							4	10	40	200		
	In				Pct	Pct					Pct	
842A: (cont.)												
Daglum-----	0-9	Loam	CL-ML	A-4	0	0	100	100	85-95	65-75	20-30	5-10
	9-16	Clay, silty clay, silty clay loam	CL, CH	A-7	0	0	100	100	90-100	75-95	40-60	20-40
	16-60	Clay, silty clay, silty clay loam	CL, CH	A-7	0	0	100	100	90-100	75-95	40-60	20-40
863E:												
Work-----	0-6	Cobbly loam	CL-ML, GM-GC, SC-SM	A-4	0	10-25	70-90	65-85	55-80	40-65	25-30	5-10
	6-22	Clay, clay loam	CL, CH	A-6, A-7	0	0-5	85-100	80-100	70-95	55-80	35-55	15-30
	22-48	Clay loam, loam	CL	A-6, A-7	0	0-5	85-100	80-100	70-95	50-75	30-45	10-20
	48-60	Gravelly clay loam, gravelly loam, clay loam	CL-ML, CL, GM- GC, GC	A-4, A-6, A-7	0	0-10	60-90	55-85	50-80	35-65	25-45	5-20
Roy-----	0-7	Stony loam	SC-SM, CL-ML	A-4	0	10-25	80-100	70-95	60-85	45-70	20-30	5-10
	7-15	Very stony clay loam, extremely stony clay, very cobbly clay loam	GC, CL, SC	A-2, A-6, A-7	0	30-65	40-80	30-70	20-65	20-55	30-50	15-30
	15-60	Extremely cobbly sandy clay loam, extremely stony clay loam, very cobbly sandy clay loam	GM-GC, SC-SM, GC, CL- ML	A-2, A-4, A-6	0	30-65	40-80	30-70	20-65	20-55	25-40	5-15
871B:												
Tamaneen-----	0-6	Cobbly clay loam	CL	A-6	0	15-35	85-95	75-90	70-85	65-80	30-40	10-20
	6-15	Silty clay, silty clay loam, clay loam	CL	A-6, A-7	0	0-5	85-100	85-100	75-95	70-90	35-50	15-30
	15-19	Clay loam, silty clay, gravelly silty clay loam	CL	A-6, A-7	0	0-5	75-95	70-90	55-80	50-75	30-50	10-25
	19-30	Very gravelly clay loam, gravelly loam	GM-GC, GC	A-2, A-4, A-6	0	0-15	50-60	45-55	30-50	25-45	25-40	5-15
	30-60	Extremely gravelly sandy loam, extremely gravelly loam	GM, GM- GC, GP- GM	A-1, A-2	0	10-30	25-40	15-30	10-25	5-20	20-30	NP-10

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Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
					Pct	Pct					Pct	
911F: (cont.)	In											
Whitlash-----	0-6	Channery loam	SM, SC-	A-4	0	0-15	70-85	60-75	50-70	35-60	20-30	NP-10
			SM,									
			ML, CL-									
			ML									
	6-15	Very cobbly	GM, GM-	A-2,	0	20-35	35-65	25-55	20-45	10-35	20-30	NP-10
		loam,	GC	A-1								
		extremely										
		channery loam,										
		very gravelly										
		sandy loam										
	15-60	Unweathered	---	---	---	---	---	---	---	---	---	---
		bedrock										
Hedoes-----	0-5	Loam	ML, SM	A-4	0	0-15	85-100	75-100	65-95	45-75	25-35	NP-5
	5-20	Loam, sandy	ML, SM	A-4	0	0-15	90-100	85-100	65-95	45-75	25-35	NP-5
		loam										
	20-31	Coarse sandy	SM	A-1,	0	0-15	85-95	30-60	45-60	10-25	---	NP
		loam, gravelly		A-2								
		sandy loam,										
		sandy loam										
	31-60	Very gravelly	GM, SM	A-1	0	0-15	45-65	30-55	15-35	10-20	---	NP
		coarse sandy										
		loam, gravelly										
		sandy loam										
916C:												
Belain-----	0-5	Sandy loam	SM	A-2	0	0-5	85-100	75-100	45-65	25-35	20-25	NP-5
	5-20	Sandy loam,	ML,	A-4	0	0-5	75-100	65-95	50-80	35-65	20-30	NP-10
		loam, gravelly	SM, CL-									
		loam	ML, SC-									
			SM									
	20-24	Gravelly sandy	GM, GM-	A-1,	0	0-5	45-75	35-65	25-55	15-40	20-30	NP-10
		loam, gravelly	GC,	A-2,								
		loam	SM, SC-	A-4								
			SM									
	24-60	Unweathered	---	---	---	---	---	---	---	---	---	---
		bedrock										
Hedoes-----	0-8	Sandy loam	SM	A-2,	0	0-15	90-100	85-100	60-70	30-40	---	NP
				A-4								
	8-18	Loam, sandy	ML, SM	A-4	0	0-15	90-100	85-100	65-95	45-75	25-35	NP-5
		loam										
	18-60	Coarse sandy	SM	A-1,	0	0-15	85-95	30-60	45-60	10-25	---	NP
		loam, gravelly		A-2								
		sandy loam,										
		sandy loam										
925F:												
Sunburst-----	0-5	Clay loam	CL	A-6	0	0-10	95-100	85-95	85-95	75-85	30-40	10-20
	5-20	Clay, clay loam	CL	A-7,	0	0-10	95-100	85-95	80-90	75-85	35-50	15-30
				A-6								
	20-60	Clay, clay loam	CL	A-7,	0	0-10	95-100	85-95	80-90	75-85	35-50	15-30
				A-6								
Lambeth-----	0-4	Silt loam	CL-ML	A-4	0	0	100	100	90-100	75-90	20-30	5-10
	4-60	Silt loam,	CL, CL-	A-4,	0	0	100	100	90-100	75-90	20-40	5-20
		silty clay loam	ML	A-6								

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Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
972F:												
Neldore-----	0-4	Silty clay	CL, CH	A-7	0	0-10	95-100	90-100	75-100	70-95	40-55	20-30
	4-15	Clay, silty clay	CL, CH	A-7	0	0	90-100	85-100	70-95	65-90	40-60	20-40
	15-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Rock outcrop----												
974F:												
Neldore-----	0-4	Silty clay	CL, CH	A-7	0	0-10	95-100	90-100	75-100	70-95	40-55	20-30
	4-15	Clay, silty clay	CL, CH	A-7	0	0	90-100	85-100	70-95	65-90	40-60	20-40
	15-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Hillon-----	0-4	Loam	ML, CL, CL-	A-4, A-6	0	0-5	85-100	80-100	80-90	65-75	20-35	NP-15
	4-60	Loam, clay loam	ML CL	A-6	0	0-5	85-100	80-100	80-90	65-80	25-35	10-20

Physical Properties of the Soils

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer)

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Physical Properties of the Soils--Continued

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
22F:											
Hillon-----	0-4	20-27	1.20-1.40	0.60-2.00	0.18-0.20	Low	0.5-2.0	0.43	0.43	5	4L
	4-60	20-35	1.50-1.75	0.06-0.20	0.15-0.18	Moderate	0.0-0.5	0.43	0.43		
27B:											
Attewan-----	0-5	10-20	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	5
	5-17	20-35	1.40-1.60	0.60-2.00	0.14-0.17	Moderate	1.0-2.0	0.32	0.32		
	17-27	15-30	1.40-1.60	0.60-2.00	0.13-0.15	Moderate	0.5-1.0	0.32	0.32		
	27-60	0-10	1.40-1.60	6.00-20.00	0.02-0.03	Low	0.0-0.5	0.05	0.24		
28:											
Nishon-----	0-8	27-35	1.25-1.45	0.60-2.00	0.14-0.17	Moderate	0.5-1.0	0.37	0.37	5	6
	8-31	40-60	1.30-1.50	0.06-0.20	0.14-0.17	High	0.5-1.0	0.32	0.32		
	31-60	35-55	1.30-1.50	0.06-0.20	0.14-0.17	High	0.0-0.5	0.32	0.32		
30B:											
Marvan-----	0-3	40-60	1.25-1.45	0.06-0.20	0.14-0.18	High	0.5-2.0	0.37	0.37	5	4
	3-46	45-60	1.30-1.50	0.00-0.06	0.11-0.13	High	0.5-1.0	0.37	0.37		
	46-60	45-60	1.30-1.50	0.00-0.06	0.09-0.11	High	0.0-0.5	0.37	0.37		
30C:											
Marvan-----	0-3	40-60	1.25-1.45	0.06-0.20	0.14-0.18	High	0.5-2.0	0.37	0.37	5	4
	3-46	45-60	1.30-1.50	0.00-0.06	0.11-0.13	High	0.5-1.0	0.37	0.37		
	46-60	45-60	1.30-1.50	0.00-0.06	0.09-0.11	High	0.0-0.5	0.37	0.37		
31A:											
Ferd-----	0-3	20-27	1.25-1.45	0.20-2.00	0.15-0.19	Low	0.5-1.0	0.43	0.43	5	6
	3-8	22-35	1.30-1.50	0.20-2.00	0.16-0.20	Low	0.5-1.0	0.37	0.37		
	8-13	35-50	1.30-1.50	0.06-0.20	0.15-0.19	High	0.5-1.0	0.37	0.37		
	13-32	27-40	1.30-1.50	0.06-0.20	0.14-0.18	Moderate	0.0-0.5	0.37	0.37		
	32-60	27-40	1.30-1.50	0.06-0.20	0.13-0.17	Moderate	0.0-0.5	0.37	0.37		
32B:											
Kobase-----	0-6	35-40	1.20-1.40	0.06-0.20	0.14-0.18	Moderate	1.0-2.0	0.37	0.37	5	4
	6-25	35-45	1.25-1.45	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37		
	25-60	35-45	1.30-1.50	0.06-0.20	0.14-0.18	High	0.0-0.5	0.37	0.37		
32C:											
Kobase-----	0-6	35-40	1.20-1.40	0.06-0.20	0.14-0.18	Moderate	1.0-2.0	0.37	0.37	5	4
	6-25	35-45	1.25-1.45	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37		
	25-60	35-45	1.30-1.50	0.06-0.20	0.14-0.18	High	0.0-0.5	0.37	0.37		
32D:											
Kobase-----	0-6	35-40	1.20-1.40	0.06-0.20	0.14-0.18	Moderate	1.0-2.0	0.37	0.37	5	4
	6-25	35-45	1.25-1.45	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37		
	25-60	35-45	1.30-1.50	0.06-0.20	0.14-0.18	High	0.0-0.5	0.37	0.37		
33A:											
Phillips-----	0-8	15-27	1.15-1.35	0.20-2.00	0.16-0.20	Low	1.0-3.0	0.43	0.43	5	5
	8-15	35-45	1.20-1.40	0.06-0.20	0.14-0.18	Moderate	1.0-2.0	0.37	0.37		
	15-32	25-40	1.30-1.50	0.06-0.20	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	32-60	25-40	1.50-1.75	0.06-0.20	0.13-0.17	Moderate	0.0-0.5	0.37	0.37		
34A:											
Linnet-----	0-7	40-45	1.15-1.35	0.06-0.20	0.14-0.18	High	1.0-3.0	0.32	0.32	5	4
	7-14	45-60	1.30-1.50	0.06-0.20	0.13-0.16	High	0.5-1.0	0.32	0.32		
	14-36	35-50	1.30-1.50	0.06-0.20	0.13-0.16	High	0.5-1.0	0.32	0.32		
	36-60	35-50	1.30-1.55	0.06-0.20	0.12-0.15	High	0.0-0.5	0.32	0.32		

Physical Properties of the Soils--Continued

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
35B:											
Assinniboine----	0-6	5-15	1.30-1.50	0.60-2.00	0.13-0.16	Low	1.0-2.0	0.24	0.24	5	3
	6-16	18-30	1.40-1.60	0.60-2.00	0.14-0.17	Low	0.5-1.0	0.32	0.32		
	16-48	10-27	1.45-1.65	2.00-6.00	0.12-0.15	Low	0.5-1.0	0.24	0.24		
	48-60	0-15	1.50-1.70	2.00-6.00	0.07-0.09	Low	0.0-0.5	0.20	0.20		
36B:											
Chinook-----	0-5	5-18	1.25-1.45	2.00-6.00	0.13-0.16	Low	1.0-2.0	0.20	0.20	5	3
	5-24	5-18	1.40-1.60	2.00-6.00	0.12-0.15	Low	0.0-1.0	0.20	0.20		
	24-60	5-15	1.40-1.60	2.00-6.00	0.11-0.12	Low	0.0-1.0	0.20	0.20		
36C:											
Chinook-----	0-5	5-18	1.25-1.45	2.00-6.00	0.13-0.16	Low	1.0-2.0	0.20	0.20	5	3
	5-24	5-18	1.40-1.60	2.00-6.00	0.12-0.15	Low	0.0-1.0	0.20	0.20		
	24-60	5-15	1.40-1.60	2.00-6.00	0.11-0.12	Low	0.0-1.0	0.20	0.20		
37B:											
Evanston-----	0-6	20-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	5	6
	6-14	25-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	14-25	20-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	25-60	15-30	1.35-1.55	0.60-2.00	0.16-0.18	Moderate	0.0-0.5	0.37	0.37		
37C:											
Evanston-----	0-6	20-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	5	6
	6-14	25-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	14-25	20-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	25-60	15-30	1.35-1.55	0.60-2.00	0.16-0.18	Moderate	0.0-0.5	0.37	0.37		
38B:											
Ethridge-----	0-6	27-35	1.15-1.35	0.20-0.60	0.16-0.20	Moderate	1.0-3.0	0.37	0.37	5	7
	6-14	35-45	1.30-1.50	0.06-0.20	0.15-0.19	High	1.0-2.0	0.32	0.32		
	14-32	30-45	1.30-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37		
	32-60	27-40	1.30-1.50	0.06-0.20	0.14-0.18	Moderate	0.0-0.5	0.37	0.37		
39B:											
Assinniboine---	0-6	10-25	1.25-1.50	0.60-2.00	0.16-0.20	Low	1.0-2.0	0.37	0.37	5	5
	6-17	18-30	1.40-1.55	0.60-2.00	0.14-0.17	Low	1.0-2.0	0.32	0.32		
	17-45	10-27	1.45-1.65	2.00-6.00	0.12-0.15	Low	0.5-1.0	0.24	0.24		
	45-60	0-15	1.50-1.65	2.00-6.00	0.07-0.09	Low	0.0-0.5	0.20	0.20		
43A:											
Pendroy-----	0-5	60-75	1.35-1.55	0.00-0.06	0.12-0.15	High	0.5-1.0	0.37	0.37	5	4
	5-44	60-75	1.35-1.55	0.00-0.06	0.12-0.15	High	0.5-1.0	0.37	0.37		
	44-60	50-65	1.30-1.50	0.00-0.06	0.12-0.15	High	0.0-0.5	0.37	0.37		
44B:											
Kevin-----	0-6	27-32	1.20-1.40	0.60-2.00	0.14-0.18	Moderate	1.0-3.0	0.37	0.37	5	6
	6-9	35-45	1.30-1.50	0.20-0.60	0.15-0.19	High	1.0-3.0	0.37	0.37		
	9-31	27-35	1.30-1.60	0.20-0.60	0.15-0.19	Moderate	0.5-1.0	0.37	0.37		
	31-60	27-35	1.60-1.80	0.06-0.20	0.12-0.15	Moderate	0.0-0.5	0.37	0.37		
47B:											
Marias-----	0-6	40-60	1.25-1.45	0.06-0.20	0.14-0.18	High	0.5-2.0	0.37	0.37	5	4
	6-38	40-60	1.30-1.50	0.00-0.06	0.12-0.16	High	0.5-1.0	0.37	0.37		
	38-60	40-60	1.30-1.55	0.00-0.06	0.12-0.16	High	0.0-0.5	0.37	0.37		
47C:											
Marias-----	0-6	40-60	1.25-1.45	0.06-0.20	0.14-0.18	High	0.5-2.0	0.37	0.37	5	4
	6-38	40-60	1.30-1.50	0.00-0.06	0.12-0.16	High	0.5-1.0	0.37	0.37		
	38-60	40-60	1.30-1.55	0.00-0.06	0.12-0.16	High	0.0-0.5	0.37	0.37		

Physical Properties of the Soils--Continued

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
48A:											
Vanda-----	0-7	40-60	1.25-1.45	0.00-0.06	0.08-0.12	High	0.5-2.0	0.43	0.43	5	4
	7-60	35-60	1.30-1.50	0.00-0.06	0.08-0.12	High	0.0-0.5	0.37	0.37		
48C:											
Vanda-----	0-7	40-60	1.25-1.45	0.00-0.06	0.08-0.12	High	0.5-2.0	0.43	0.43	5	4
	7-60	35-60	1.30-1.50	0.00-0.06	0.08-0.12	High	0.0-0.5	0.37	0.37		
50A:											
Telstad-----	0-5	18-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.43	0.43	5	6
	5-14	25-35	1.25-1.45	0.20-0.60	0.16-0.19	Moderate	1.0-2.0	0.37	0.37		
	14-38	20-32	1.30-1.50	0.20-0.60	0.15-0.18	Moderate	0.5-1.0	0.37	0.37		
	38-60	20-32	1.50-1.75	0.06-0.20	0.14-0.17	Moderate	0.0-0.5	0.37	0.37		
55B:											
Lihen-----	0-12	5-10	1.35-1.55	6.00-20.00	0.10-0.12	Low	1.0-2.0	0.17	0.17	5	2
	12-60	0-10	1.40-1.65	6.00-20.00	0.07-0.09	Low	0.0-0.5	0.17	0.17		
56A:											
Scobey-----	0-6	27-35	1.15-1.35	0.60-2.00	0.16-0.18	Moderate	1.0-3.0	0.37	0.37	5	6
	6-15	35-45	1.30-1.50	0.20-0.60	0.15-0.18	High	0.5-1.0	0.32	0.32		
	15-60	30-40	1.35-1.65	0.06-0.20	0.15-0.18	Moderate	0.0-0.5	0.37	0.37		
57B:											
Absarokee-----	0-7	27-35	1.15-1.35	0.60-2.00	0.15-0.19	Moderate	3.0-6.0	0.28	0.28	2	6
	7-18	35-50	1.20-1.40	0.20-0.60	0.13-0.16	High	1.0-2.0	0.28	0.28		
	18-34	30-40	1.30-1.50	0.20-0.60	0.12-0.15	Moderate	0.5-1.0	0.37	0.37		
	34-60	---	---	---	---	---	---	---	---		
57C:											
Absarokee-----	0-7	27-35	1.15-1.35	0.60-2.00	0.15-0.19	Moderate	3.0-6.0	0.28	0.28	2	6
	7-18	35-50	1.20-1.40	0.20-0.60	0.13-0.16	High	1.0-2.0	0.28	0.28		
	18-34	30-40	1.30-1.50	0.20-0.60	0.12-0.15	Moderate	0.5-1.0	0.37	0.37		
	34-60	---	---	---	---	---	---	---	---		
57E:											
Absarokee-----	0-7	27-35	1.15-1.35	0.60-2.00	0.15-0.19	Moderate	3.0-6.0	0.28	0.28	2	6
	7-18	35-50	1.20-1.40	0.20-0.60	0.13-0.16	High	1.0-2.0	0.28	0.28		
	18-34	30-40	1.30-1.50	0.20-0.60	0.12-0.15	Moderate	0.5-1.0	0.37	0.37		
	34-60	---	---	---	---	---	---	---	---		
Reeder-----	0-7	15-27	1.10-1.30	0.60-2.00	0.18-0.22	Low	2.0-4.0	0.32	0.32	3	6
	7-12	18-35	1.30-1.50	0.60-2.00	0.14-0.17	Moderate	1.0-2.0	0.17	0.17		
	12-34	15-30	1.30-1.50	0.60-2.00	0.14-0.17	Low	0.5-1.0	0.32	0.37		
	34-60	---	---	---	---	---	---	---	---		
58B:											
Lonna-----	0-6	27-35	1.15-1.35	0.60-2.00	0.16-0.20	Moderate	1.0-3.0	0.32	0.32	5	4L
	6-11	18-35	1.25-1.45	0.60-2.00	0.16-0.20	Moderate	0.5-1.0	0.37	0.37		
	11-34	18-35	1.25-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	34-60	10-35	1.25-1.50	0.60-2.00	0.12-0.16	Moderate	0.0-0.5	0.37	0.37		
58C:											
Lonna-----	0-6	27-35	1.15-1.35	0.60-2.00	0.16-0.20	Moderate	1.0-3.0	0.32	0.32	5	4L
	6-11	18-35	1.25-1.45	0.60-2.00	0.16-0.20	Moderate	0.5-1.0	0.37	0.37		
	11-34	18-35	1.25-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	34-60	10-35	1.25-1.50	0.60-2.00	0.12-0.16	Moderate	0.0-0.5	0.37	0.37		

Physical Properties of the Soils--Continued

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
60A:											
Havre-----	0-6	20-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	0.5-2.0	0.37	0.37	5	6
	6-60	18-35	1.35-1.55	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.28	0.28		
63:											
Lardell-----	0-4	40-55	1.20-1.40	0.06-0.20	0.07-0.09	High	0.5-2.0	0.37	0.37	5	4
	4-38	35-50	1.30-1.50	0.06-0.20	0.07-0.09	Moderate	0.0-0.5	0.37	0.37		
	38-60	30-45	1.35-1.55	0.06-0.20	0.07-0.09	Moderate	0.0-0.5	0.37	0.37		
67B:											
Bearpaw-----	0-6	27-35	1.15-1.35	0.20-0.60	0.15-0.18	Moderate	1.0-3.0	0.37	0.37	5	6
	6-16	35-50	1.30-1.50	0.20-0.60	0.15-0.18	High	0.5-1.0	0.37	0.37		
	16-34	35-45	1.30-1.55	0.20-0.60	0.15-0.18	High	0.0-0.5	0.37	0.37		
	34-60	30-45	1.35-1.65	0.06-0.20	0.12-0.15	High	0.0-0.5	0.37	0.37		
67C:											
Bearpaw-----	0-6	27-35	1.15-1.35	0.20-0.60	0.15-0.18	Moderate	1.0-3.0	0.37	0.37	5	6
	6-16	35-50	1.30-1.50	0.20-0.60	0.15-0.18	High	0.5-1.0	0.37	0.37		
	16-34	35-45	1.30-1.55	0.20-0.60	0.15-0.18	High	0.0-0.5	0.37	0.37		
	34-60	30-45	1.35-1.65	0.06-0.20	0.12-0.15	High	0.0-0.5	0.37	0.37		
68B:											
Gerber-----	0-7	40-50	1.15-1.35	0.06-0.20	0.14-0.18	High	1.0-3.0	0.32	0.32	5	4
	7-16	45-60	1.20-1.40	0.06-0.20	0.14-0.18	High	1.0-2.0	0.32	0.32		
	16-46	35-50	1.25-1.45	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37		
	46-60	35-50	1.35-1.60	0.06-0.20	0.14-0.18	High	0.0-0.5	0.37	0.37		
69C:											
Vida-----	0-5	27-30	1.20-1.40	0.60-2.00	0.14-0.18	Moderate	1.0-3.0	0.37	0.37	5	6
	5-15	25-35	1.30-1.50	0.20-0.60	0.14-0.18	Moderate	1.0-2.0	0.37	0.37		
	15-60	25-35	1.50-1.75	0.06-0.20	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
Zahill-----	0-3	27-35	1.20-1.40	0.60-2.00	0.14-0.18	Moderate	0.5-2.0	0.37	0.37	5	4L
	3-18	20-35	1.30-1.60	0.20-0.60	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	18-60	20-35	1.60-1.80	0.06-0.20	0.14-0.18	Moderate	0.0-0.5	0.37	0.37		
71D:											
Roy-----	0-7	27-40	1.15-1.35	0.60-2.00	0.08-0.09	Moderate	2.0-4.0	0.10	0.32	5	6
	7-15	35-50	1.30-1.50	0.20-0.60	0.07-0.08	Moderate	0.5-1.0	0.05	0.28		
	15-60	27-40	1.45-1.65	0.20-0.60	0.06-0.07	Moderate	0.0-0.5	0.05	0.28		
72F:											
Zahill-----	0-3	27-35	1.20-1.40	0.60-2.00	0.14-0.18	Moderate	0.5-2.0	0.37	0.37	5	4L
	3-18	20-35	1.30-1.60	0.20-0.60	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	18-60	20-35	1.60-1.80	0.06-0.20	0.14-0.18	Moderate	0.0-0.5	0.37	0.37		
73B:											
Yetull-----	0-5	0-10	1.35-1.55	6.00-20.00	0.05-0.08	Low	1.0-2.0	0.20	0.20	5	2
	5-60	0-10	1.45-1.65	6.00-20.00	0.05-0.07	Low	0.0-1.0	0.20	0.20		
Lonesome-----	0-6	5-15	1.45-1.65	6.00-20.00	0.08-0.10	Low	0.5-1.0	0.28	0.28	5	2
	6-32	5-15	1.50-1.70	6.00-20.00	0.08-0.10	Low	0.0-0.5	0.24	0.24		
	32-60	20-35	1.30-1.50	0.06-0.20	0.15-0.18	Moderate	0.0-0.5	0.37	0.37		
74C:											
Shambo-----	0-6	20-27	1.10-1.30	0.60-2.00	0.18-0.22	Low	2.0-6.0	0.32	0.32	5	6
	6-15	18-35	1.20-1.50	0.60-2.00	0.17-0.19	Moderate	1.0-2.0	0.37	0.37		
	15-60	18-35	1.20-1.50	0.60-2.00	0.17-0.19	Moderate	0.5-1.0	0.37	0.37		

Physical Properties of the Soils--Continued

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
75B:											
Farnuf-----	0-6	15-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	2.0-4.0	0.37	0.37	5	6
	6-18	25-35	1.25-1.45	0.60-2.00	0.14-0.18	Moderate	1.0-3.0	0.32	0.32		
	18-46	20-30	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.32	0.32		
	46-60	15-30	1.30-1.50	0.60-2.00	0.12-0.16	Low	0.0-0.5	0.20	0.32		
75C:											
Farnuf-----	0-6	15-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	2.0-4.0	0.37	0.37	5	6
	6-18	25-35	1.25-1.45	0.60-2.00	0.14-0.18	Moderate	1.0-3.0	0.32	0.32		
	18-46	20-30	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.32	0.32		
	46-60	15-30	1.30-1.50	0.60-2.00	0.12-0.16	Low	0.0-0.5	0.20	0.32		
76C:											
Hedoes-----	0-5	10-15	1.05-1.25	0.60-2.00	0.16-0.20	Low	5.0-10	0.28	0.28	5	5
	5-20	10-18	1.30-1.50	0.60-2.00	0.14-0.17	Low	4.0-8.0	0.28	0.28		
	20-31	5-18	1.40-1.60	2.00-6.00	0.09-0.11	Low	0.5-1.0	0.15	0.24		
	31-60	0-10	1.40-1.60	2.00-6.00	0.06-0.07	Low	0.0-0.5	0.10	0.24		
77F:											
Tinsley-----	0-6	5-10	1.30-1.50	2.00-6.00	0.08-0.11	Low	0.7-2.0	0.10	0.20	5	3
	6-60	0-10	1.45-1.65	6.00-20.00	0.01-0.02	Low	0.0-0.5	0.05	0.17		
79B:											
Yamacall-----	0-4	18-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-2.0	0.37	0.37	5	6
	4-12	18-35	1.25-1.45	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	12-60	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.37	0.37		
79C:											
Yamacall-----	0-4	18-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-2.0	0.37	0.37	5	6
	4-12	18-35	1.25-1.45	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	12-60	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.37	0.37		
79D:											
Yamacall-----	0-4	18-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-2.0	0.37	0.37	5	6
	4-12	18-35	1.25-1.45	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	12-60	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.37	0.37		
81A:											
Glendive-----	0-6	5-15	1.30-1.50	2.00-6.00	0.13-0.16	Low	0.5-2.0	0.20	0.20	5	3
	6-29	5-18	1.30-1.50	2.00-6.00	0.15-0.18	Low	0.5-1.0	0.32	0.32		
	29-60	5-18	1.35-1.60	2.00-6.00	0.10-0.14	Low	0.5-1.0	0.20	0.20		
82B:											
Savage-----	0-6	27-35	1.20-1.40	0.60-2.00	0.16-0.20	Moderate	2.0-4.0	0.37	0.37	5	7
	6-16	35-50	1.30-1.50	0.06-0.20	0.14-0.18	High	1.0-3.0	0.32	0.32		
	16-60	30-45	1.35-1.55	0.06-0.20	0.13-0.16	High	0.5-1.0	0.32	0.32		
86B:											
Work-----	0-6	27-35	1.15-1.35	0.60-2.00	0.15-0.18	Moderate	2.0-4.0	0.28	0.28	5	6
	6-22	35-50	1.25-1.50	0.20-0.60	0.14-0.17	High	1.0-2.0	0.28	0.28		
	22-48	20-40	1.30-1.50	0.20-0.60	0.14-0.17	Moderate	0.5-1.0	0.32	0.32		
	48-60	15-40	1.30-1.55	0.20-0.60	0.11-0.15	Moderate	0.0-0.5	0.17	0.24		
86C:											
Work-----	0-6	27-35	1.15-1.35	0.60-2.00	0.15-0.18	Moderate	2.0-4.0	0.28	0.28	5	6
	6-22	35-50	1.25-1.50	0.20-0.60	0.14-0.17	High	1.0-2.0	0.28	0.28		
	22-48	20-40	1.30-1.50	0.20-0.60	0.14-0.17	Moderate	0.5-1.0	0.32	0.32		
	48-60	15-40	1.30-1.55	0.20-0.60	0.11-0.15	Moderate	0.0-0.5	0.17	0.24		

Physical Properties of the Soils--Continued

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
86D:											
Work-----	0-6	27-35	1.15-1.35	0.60-2.00	0.15-0.18	Moderate	2.0-4.0	0.28	0.28	5	6
	6-22	35-50	1.25-1.50	0.20-0.60	0.14-0.17	High	1.0-2.0	0.28	0.28		
	22-48	20-40	1.30-1.50	0.20-0.60	0.14-0.17	Moderate	0.5-1.0	0.32	0.32		
	48-60	15-40	1.30-1.55	0.20-0.60	0.11-0.15	Moderate	0.0-0.5	0.17	0.24		
87B:											
Tamaneen-----	0-5	27-35	1.15-1.35	0.60-2.00	0.15-0.17	Moderate	2.0-5.0	0.28	0.28	3	6
	5-14	35-50	1.20-1.40	0.20-0.60	0.14-0.16	High	1.0-3.0	0.32	0.32		
	14-19	30-45	1.25-1.45	0.20-0.60	0.14-0.16	Moderate	1.0-2.0	0.32	0.32		
	19-29	18-35	1.30-1.50	0.60-2.00	0.10-0.12	Low	0.5-1.0	0.10	0.28		
	29-60	8-25	1.40-1.60	2.00-6.00	0.04-0.05	Low	0.0-0.5	0.05	0.32		
88C:											
Perma-----	0-10	7-20	1.30-1.50	0.60-2.00	0.12-0.14	Low	2.0-4.0	0.17	0.32	5	5
	10-38	7-27	1.40-1.60	0.60-2.00	0.08-0.09	Low	1.0-2.0	0.10	0.37		
	38-60	0-15	1.50-1.70	2.00-6.00	0.03-0.04	Low	0.0-0.5	0.05	0.37		
90A:											
Harlake-----	0-8	40-55	1.30-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.32	0.32	5	4
	8-48	35-60	1.30-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37		
	48-60	15-35	1.30-1.55	0.06-0.20	0.12-0.14	Low	0.5-1.0	0.37	0.37		
92E:											
Sunburst-----	0-5	35-40	1.20-1.40	0.06-0.20	0.14-0.18	Moderate	1.0-3.0	0.37	0.37	5	4
	5-20	35-50	1.25-1.45	0.06-0.20	0.12-0.15	High	0.5-1.0	0.37	0.37		
	20-60	35-50	1.35-1.60	0.06-0.20	0.12-0.15	High	0.0-0.5	0.37	0.37		
Bascovy-----	0-4	40-60	1.20-1.40	0.00-0.06	0.14-0.18	High	1.0-2.0	0.37	0.37	3	4
	4-15	45-60	1.30-1.50	0.00-0.06	0.14-0.18	High	0.5-1.0	0.37	0.37		
	15-29	45-60	1.30-1.50	0.00-0.06	0.13-0.16	High	0.0-0.5	0.37	0.37		
	29-60	---	---	---	---	---	---	---	---		
93F:											
Yetull-----	0-8	0-10	1.30-1.50	2.00-6.00	0.11-0.15	Low	1.0-2.0	0.24	0.24	5	3
	8-60	0-10	1.45-1.65	6.00-20.00	0.05-0.07	Low	0.0-0.5	0.20	0.20		
94B:											
Busby-----	0-4	10-18	1.30-1.50	2.00-6.00	0.12-0.16	Low	1.0-2.0	0.20	0.20	5	3
	4-11	10-18	1.40-1.60	2.00-6.00	0.12-0.16	Low	0.5-1.0	0.32	0.32		
	11-28	10-18	1.40-1.60	2.00-6.00	0.12-0.15	Low	0.0-0.5	0.20	0.20		
	28-60	3-18	1.50-1.70	2.00-6.00	0.08-0.10	Low	0.0-0.5	0.20	0.20		
94C:											
Busby-----	0-4	10-18	1.30-1.50	2.00-6.00	0.12-0.16	Low	1.0-2.0	0.20	0.20	5	3
	4-11	10-18	1.40-1.60	2.00-6.00	0.12-0.16	Low	0.5-1.0	0.32	0.32		
	11-28	10-18	1.40-1.60	2.00-6.00	0.12-0.15	Low	0.0-0.5	0.20	0.20		
	28-60	3-18	1.50-1.70	2.00-6.00	0.08-0.10	Low	0.0-0.5	0.20	0.20		
94D:											
Busby-----	0-4	10-18	1.30-1.50	2.00-6.00	0.12-0.16	Low	1.0-2.0	0.20	0.20	5	3
	4-11	10-18	1.40-1.60	2.00-6.00	0.12-0.16	Low	0.5-1.0	0.32	0.32		
	11-28	10-18	1.40-1.60	2.00-6.00	0.12-0.15	Low	0.0-0.5	0.20	0.20		
	28-60	3-18	1.50-1.70	2.00-6.00	0.08-0.10	Low	0.0-0.5	0.20	0.20		
96B:											
Macar-----	0-6	18-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	5	6
	6-15	18-35	1.25-1.45	0.60-2.00	0.14-0.17	Moderate	1.0-2.0	0.32	0.32		
	15-45	18-35	1.30-1.50	0.60-2.00	0.14-0.17	Moderate	0.5-1.0	0.32	0.32		
	45-60	15-30	1.30-1.60	0.60-2.00	0.13-0.15	Moderate	0.0-0.5	0.32	0.32		

Physical Properties of the Soils--Continued

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
96C:											
Macar-----	0-6	18-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	5	6
	6-15	18-35	1.25-1.45	0.60-2.00	0.14-0.17	Moderate	1.0-2.0	0.32	0.32		
	15-45	18-35	1.30-1.50	0.60-2.00	0.14-0.17	Moderate	0.5-1.0	0.32	0.32		
	45-60	15-30	1.30-1.60	0.60-2.00	0.13-0.15	Moderate	0.0-0.5	0.32	0.32		
98B:											
Kremlin-----	0-6	18-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	5	6
	6-11	18-30	1.25-1.45	0.60-2.00	0.16-0.20	Moderate	1.0-2.0	0.37	0.37		
	11-30	18-30	1.30-1.50	0.60-2.00	0.16-0.20	Moderate	0.5-1.0	0.37	0.37		
	30-60	10-25	1.30-1.55	0.60-2.00	0.14-0.18	Low	0.0-0.5	0.37	0.37		
98C:											
Kremlin-----	0-6	18-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	5	6
	6-11	18-30	1.25-1.45	0.60-2.00	0.16-0.20	Moderate	1.0-2.0	0.37	0.37		
	11-30	18-30	1.30-1.50	0.60-2.00	0.16-0.20	Moderate	0.5-1.0	0.37	0.37		
	30-60	10-25	1.30-1.55	0.60-2.00	0.14-0.18	Low	0.0-0.5	0.37	0.37		
99:											
Rivra-----	0-6	5-15	1.30-1.50	2.00-6.00	0.13-0.16	Low	0.5-2.0	0.20	0.20	5	3
	6-60	0-5	1.50-1.70	6.00-20.00	0.02-0.03	Low	0.0-0.5	0.02	0.10		
Hanly-----	0-5	5-10	1.30-1.50	6.00-20.00	0.08-0.10	Low	0.5-1.0	0.17	0.17	5	2
	5-60	5-10	1.45-1.65	6.00-20.00	0.08-0.11	Low	0.5-1.0	0.17	0.17		
110C:											
Laceycreek-----	0-18	15-24	1.10-1.30	0.60-2.00	0.17-0.20	Low	4.0-8.0	0.28	0.28	5	5
	18-26	24-35	1.20-1.40	0.60-2.00	0.16-0.19	Moderate	1.0-3.0	0.37	0.37		
	26-44	20-35	1.30-1.50	0.60-2.00	0.15-0.18	Moderate	1.0-3.0	0.32	0.32		
	44-60	5-20	1.35-1.55	2.00-6.00	0.12-0.16	Low	0.5-1.0	0.37	0.37		
110D:											
Laceycreek-----	0-18	15-24	1.10-1.30	0.60-2.00	0.17-0.20	Low	4.0-8.0	0.28	0.28	5	5
	18-26	24-35	1.20-1.40	0.60-2.00	0.16-0.19	Moderate	1.0-3.0	0.37	0.37		
	26-44	20-35	1.30-1.50	0.60-2.00	0.15-0.18	Moderate	1.0-3.0	0.32	0.32		
	44-60	5-20	1.35-1.55	2.00-6.00	0.12-0.16	Low	0.5-1.0	0.37	0.37		
110E:											
Laceycreek-----	0-18	15-24	1.10-1.30	0.60-2.00	0.17-0.20	Low	4.0-8.0	0.28	0.28	5	5
	18-26	24-35	1.20-1.40	0.60-2.00	0.16-0.19	Moderate	1.0-3.0	0.37	0.37		
	26-44	20-35	1.30-1.50	0.60-2.00	0.15-0.18	Moderate	1.0-3.0	0.32	0.32		
	44-60	5-20	1.35-1.55	2.00-6.00	0.12-0.16	Low	0.5-1.0	0.37	0.37		
130A:											
Nesda-----	0-12	10-20	1.10-1.30	0.60-2.00	0.14-0.18	Low	2.0-4.0	0.28	0.28	2	5
	12-60	0-10	1.55-1.70	6.00-20.00	0.03-0.04	Low	0.5-1.0	0.02	0.10		
Nesda-----	0-10	10-20	1.30-1.50	2.00-6.00	0.06-0.10	Low	2.0-4.0	0.05	0.17	2	3
	10-60	0-10	1.50-1.70	6.00-20.00	0.03-0.05	Low	0.5-1.0	0.02	0.10		
McIlwaine-----	0-6	5-18	1.15-1.35	2.00-6.00	0.11-0.16	Low	2.0-4.0	0.17	0.17	3	3
	6-26	5-18	1.20-1.40	2.00-6.00	0.10-0.15	Low	1.0-3.0	0.20	0.20		
	26-60	0-5	1.30-1.45	6.00-20.00	0.02-0.04	Low	0.0-0.5	0.05	0.17		
140A:											
Klayent-----	0-6	27-40	1.15-1.35	0.60-2.00	0.16-0.20	Moderate	2.0-4.0	0.32	0.32	5	4
	6-20	35-50	1.20-1.40	0.06-0.20	0.14-0.18	High	1.0-2.0	0.32	0.32		
	20-32	30-45	1.25-1.45	0.06-0.20	0.12-0.15	Moderate	0.5-1.0	0.37	0.37		
	32-60	30-45	1.50-1.70	0.20-2.00	0.10-0.12	Moderate	0.0-0.5	0.32	0.32		

Physical Properties of the Soils--Continued

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
141B:											
Megonot-----	0-6	35-40	1.20-1.40	0.06-0.20	0.14-0.17	Moderate	1.0-3.0	0.37	0.37	3	4
	6-26	35-45	1.25-1.45	0.06-0.20	0.12-0.14	High	0.5-1.0	0.37	0.37		
	26-60	---	---	---	---	---	---	---	---		
Weingart-----	0-7	35-40	1.20-1.40	0.06-0.20	0.16-0.19	Moderate	1.0-2.0	0.43	0.43	2	6
	7-10	40-60	1.30-1.55	0.00-0.06	0.12-0.15	High	0.5-1.0	0.37	0.37		
	10-28	35-55	1.30-1.55	0.00-0.06	0.09-0.11	High	0.0-0.5	0.37	0.37		
	28-60	---	---	---	---	---	---	---	---		
Delpoint-----	0-4	18-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	4L
	4-12	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	1.0-2.0	0.37	0.37		
	12-30	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	30-60	---	---	---	---	---	---	---	---		
142C:											
Megonot-----	0-6	35-40	1.20-1.40	0.06-0.20	0.14-0.17	Moderate	1.0-3.0	0.37	0.37	3	4
	6-26	35-45	1.25-1.45	0.06-0.20	0.12-0.14	High	0.5-1.0	0.37	0.37		
	26-60	---	---	---	---	---	---	---	---		
Kobase-----	0-6	35-40	1.25-1.45	0.06-0.20	0.14-0.18	Moderate	1.0-2.0	0.37	0.37	5	4L
	6-25	35-45	1.25-1.45	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37		
	25-60	35-45	1.30-1.50	0.06-0.20	0.14-0.18	High	0.0-0.5	0.37	0.37		
Delpoint-----	0-4	18-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	4L
	4-12	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	1.0-2.0	0.37	0.37		
	12-30	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	30-60	---	---	---	---	---	---	---	---		
160A:											
Bigsandy-----	0-3	15-27	1.07-1.36	0.60-2.00	0.14-0.18	Low	1.0-2.0	0.43	0.43	5	4L
	3-11	18-35	1.30-1.50	0.20-0.60	0.13-0.17	Low	0.5-1.0	0.37	0.37		
	11-32	18-35	1.30-1.50	0.20-0.60	0.12-0.16	Low	0.0-0.5	0.05	0.05		
	32-60	15-35	1.30-1.50	0.06-0.20	0.10-0.14	Moderate	0.0-0.5	0.37	0.37		
171C:											
Delpoint-----	0-4	18-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	4L
	4-12	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	1.0-2.0	0.37	0.37		
	12-30	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	30-60	---	---	---	---	---	---	---	---		
Cabbart-----	0-4	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L
	4-18	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37		
	18-60	---	---	---	---	---	---	---	---		
180A:											
McIlwaine-----	0-6	5-18	1.15-1.35	2.00-6.00	0.13-0.16	Low	2.0-4.0	0.17	0.17	3	3
	6-26	5-18	1.20-1.40	2.00-6.00	0.10-0.13	Low	1.0-3.0	0.20	0.20		
	26-60	0-5	1.35-1.55	6.00-20.00	0.01-0.02	Low	0.0-0.5	0.05	0.17		
Nesda-----	0-12	10-20	1.20-1.40	0.60-2.00	0.12-0.16	Low	2.0-4.0	0.17	0.37	2	5
	12-60	0-10	1.55-1.70	6.00-20.00	0.03-0.04	Low	0.5-1.0	0.02	0.10		
Straw-----	0-8	18-27	1.05-1.25	0.60-2.00	0.18-0.22	Low	2.0-4.0	0.32	0.32	5	6
	8-42	18-35	1.25-1.50	0.60-2.00	0.14-0.18	Low	1.0-3.0	0.37	0.37		
	42-60	5-20	1.30-1.60	2.00-6.00	0.10-0.13	Low	0.0-0.5	0.24	0.24		

Physical Properties of the Soils--Continued

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
212F:											
Cabbart-----	0-4	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L
	4-18	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37		
	18-60	---	---	---	---	---	---	---	---		
Hillon-----	0-4	20-27	1.20-1.40	0.60-2.00	0.18-0.20	Low	0.5-2.0	0.43	0.43	5	4L
	4-60	20-35	1.50-1.75	0.06-0.20	0.15-0.18	Moderate	0.0-0.5	0.43	0.43		
221E:											
Hillon-----	0-4	27-35	1.25-1.35	0.60-2.00	0.15-0.18	Moderate	0.5-2.0	0.37	0.37	5	4L
	4-60	20-35	1.50-1.75	0.06-0.20	0.15-0.18	Moderate	0.0-0.5	0.43	0.43		
Kevin-----	0-6	27-32	1.20-1.40	0.60-2.00	0.14-0.18	Moderate	1.0-3.0	0.37	0.37	5	6
	6-9	35-45	1.30-1.50	0.20-0.60	0.15-0.19	High	1.0-3.0	0.37	0.37		
	9-31	27-35	1.30-1.60	0.20-0.60	0.15-0.19	Moderate	0.5-1.0	0.37	0.37		
	31-60	27-35	1.60-1.80	0.06-0.20	0.12-0.15	Moderate	0.0-0.5	0.37	0.37		
222D:											
Hillon-----	0-4	20-27	1.20-1.40	0.60-2.00	0.18-0.20	Low	0.5-2.0	0.43	0.43	5	4L
	4-60	20-35	1.50-1.75	0.06-0.20	0.15-0.18	Moderate	0.0-0.5	0.43	0.43		
Delpoint-----	0-4	18-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	4L
	4-12	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	1.0-2.0	0.37	0.37		
	12-30	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	30-60	---	---	---	---	---	---	---	---		
223E:											
Hillon-----	0-4	20-27	1.20-1.40	0.60-2.00	0.18-0.20	Low	0.5-2.0	0.43	0.43	5	4L
	4-60	20-35	1.50-1.75	0.06-0.20	0.15-0.18	Moderate	0.0-0.5	0.43	0.43		
Fleak-----	0-3	0-10	1.20-1.50	6.00-20.00	0.08-0.10	Low	0.5-1.0	0.20	0.20	2	2
	3-18	0-10	1.20-1.50	6.00-20.00	0.06-0.07	Low	0.0-0.5	0.20	0.20		
	18-60	---	---	---	---	---	---	---	---		
224E:											
Hillon-----	0-4	20-27	1.20-1.40	0.60-2.00	0.18-0.20	Low	0.5-2.0	0.43	0.43	5	4L
	4-60	20-35	1.50-1.75	0.06-0.20	0.15-0.18	Moderate	0.0-0.5	0.43	0.43		
Joplin-----	0-6	18-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.43	0.43	5	6
	6-9	25-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	1.0-2.0	0.37	0.37		
	9-38	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.28	0.37		
	38-60	18-32	1.60-1.80	0.06-0.20	0.13-0.16	Moderate	0.0-0.5	0.28	0.37		
227F:											
Hillon-----	0-4	20-27	1.20-1.40	0.60-2.00	0.18-0.20	Low	0.5-2.0	0.43	0.43	5	4L
	4-60	20-35	1.50-1.75	0.06-0.20	0.15-0.18	Moderate	0.0-0.5	0.43	0.43		
Fleak-----	0-3	0-10	1.20-1.50	6.00-20.00	0.08-0.10	Low	0.5-1.0	0.20	0.20	2	2
	3-18	0-10	1.20-1.50	6.00-20.00	0.06-0.07	Low	0.0-0.5	0.20	0.20		
	18-60	---	---	---	---	---	---	---	---		
Rock outcrop----											
229E:											
Hillon-----	0-4	27-35	1.25-1.35	0.60-2.00	0.15-0.18	Moderate	0.5-2.0	0.37	0.37	5	4L
	4-60	20-35	1.50-1.75	0.06-0.20	0.15-0.18	Moderate	0.0-0.5	0.43	0.43		
Lambeth-----	0-4	20-27	1.20-1.40	0.20-0.60	0.18-0.22	Low	1.0-2.0	0.43	0.43	5	4L
	4-60	20-35	1.25-1.50	0.20-0.60	0.17-0.21	Moderate	0.0-1.0	0.37	0.37		

Physical Properties of the Soils--Continued

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
232A:											
Acel-----	0-6	27-35	1.15-1.35	0.20-0.60	0.16-0.20	Moderate	1.0-3.0	0.37	0.37	5	7
	6-20	40-55	1.25-1.45	0.06-0.20	0.14-0.17	High	0.5-1.0	0.32	0.32		
	20-60	35-45	1.35-1.60	0.06-0.20	0.14-0.17	High	0.0-0.5	0.37	0.37		
251C:											
Bascovy-----	0-4	40-60	1.20-1.40	0.00-0.06	0.14-0.18	High	1.0-2.0	0.37	0.37	3	4
	4-15	45-60	1.30-1.50	0.00-0.06	0.14-0.18	High	0.5-1.0	0.37	0.37		
	15-29	45-60	1.30-1.50	0.00-0.06	0.13-0.16	High	0.0-0.5	0.37	0.37		
	29-60	---	---	---	---	---	---	---	---		
Neldore-----	0-4	40-50	1.20-1.40	0.06-0.20	0.14-0.18	High	1.0-3.0	0.32	0.32	2	4
	4-15	40-60	1.30-1.50	0.06-0.20	0.12-0.16	High	0.5-1.0	0.32	0.32		
	15-60	---	---	---	---	---	---	---	---		
251E:											
Bascovy-----	0-4	40-60	1.20-1.40	0.00-0.06	0.14-0.18	High	1.0-2.0	0.37	0.37	3	4
	4-15	45-60	1.30-1.50	0.00-0.06	0.14-0.18	High	0.5-1.0	0.37	0.37		
	15-29	45-60	1.30-1.50	0.00-0.06	0.13-0.16	High	0.0-0.5	0.37	0.37		
	29-60	---	---	---	---	---	---	---	---		
Neldore-----	0-4	40-50	1.20-1.40	0.06-0.20	0.14-0.18	High	1.0-3.0	0.32	0.32	2	4
	4-15	40-60	1.30-1.50	0.06-0.20	0.12-0.16	High	0.5-1.0	0.32	0.32		
	15-60	---	---	---	---	---	---	---	---		
252C:											
Bascovy-----	0-4	40-60	1.20-1.40	0.00-0.06	0.14-0.18	High	1.0-2.0	0.37	0.37	3	4
	4-15	45-60	1.30-1.50	0.00-0.06	0.14-0.18	High	0.5-1.0	0.37	0.37		
	15-29	45-60	1.30-1.50	0.00-0.06	0.13-0.16	High	0.0-0.5	0.37	0.37		
	29-60	---	---	---	---	---	---	---	---		
Marvan-----	0-3	40-60	1.25-1.45	0.06-0.20	0.14-0.18	High	0.5-2.0	0.37	0.37	5	4
	3-46	45-60	1.30-1.50	0.00-0.06	0.11-0.13	High	0.5-1.0	0.37	0.37		
	46-60	45-60	1.30-1.50	0.00-0.06	0.09-0.11	High	0.0-0.5	0.37	0.37		
261B:											
Absher-----	0-7	40-55	1.20-1.40	0.00-0.06	0.10-0.13	High	1.0-2.0	0.43	0.43	2	4
	7-11	35-60	1.35-1.60	0.00-0.06	0.08-0.10	High	0.5-1.0	0.37	0.37		
	11-60	35-50	1.30-1.55	0.00-0.06	0.05-0.07	High	0.0-0.5	0.43	0.43		
Nobe-----	0-7	40-50	1.30-1.50	0.00-0.06	0.13-0.16	High	0.5-2.0	0.43	0.43	5	4
	7-20	35-60	1.30-1.50	0.00-0.06	0.06-0.07	High	0.5-1.0	0.43	0.43		
	20-60	35-60	1.30-1.55	0.00-0.06	0.06-0.07	High	0.0-0.5	0.43	0.43		
263A:											
Toston-----	0-6	27-35	1.30-1.40	0.20-0.60	0.13-0.17	Moderate	1.0-3.0	0.37	0.37	2	6
	6-9	35-45	1.35-1.45	0.06-0.20	0.11-0.15	Moderate	0.5-2.0	0.32	0.32		
	9-16	27-35	1.30-1.40	0.20-0.60	0.11-0.15	Moderate	0.5-1.0	0.32	0.32		
	16-60	18-30	1.30-1.40	0.60-2.00	0.10-0.14	Low	0.0-0.5	0.32	0.32		
264A:											
Toston-----	0-6	27-35	1.30-1.40	0.20-0.60	0.13-0.17	Moderate	1.0-3.0	0.37	0.37	2	6
	6-9	35-45	1.35-1.45	0.06-0.20	0.11-0.15	Moderate	0.5-2.0	0.32	0.32		
	9-16	27-35	1.30-1.40	0.20-0.60	0.11-0.15	Moderate	0.5-1.0	0.32	0.32		
	16-60	18-30	1.30-1.40	0.60-2.00	0.10-0.14	Low	0.0-0.5	0.32	0.32		
Nobe-----	0-5	40-60	1.20-1.40	0.06-0.20	0.11-0.13	High	0.5-2.0	0.43	0.43	5	4
	5-38	35-60	1.40-1.60	0.01-0.06	0.05-0.08	High	0.5-1.0	0.43	0.43		
	38-60	35-60	1.40-1.60	0.01-0.06	0.05-0.08	High	0.0-0.5	0.43	0.43		

Physical Properties of the Soils--Continued

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
265B:											
Absher-----	0-7	40-55	1.20-1.40	0.00-0.06	0.10-0.13	High	1.0-2.0	0.43	0.43	2	4
	7-11	35-60	1.35-1.60	0.00-0.06	0.08-0.10	High	0.5-1.0	0.37	0.37		
	11-60	35-50	1.30-1.55	0.00-0.06	0.05-0.07	High	0.0-0.5	0.43	0.43		
Gerdum-----	0-7	27-40	1.20-1.40	0.20-0.60	0.14-0.18	Moderate	1.0-3.0	0.43	0.43	2	6
	7-16	35-55	1.30-1.55	0.00-0.06	0.10-0.13	High	0.5-1.0	0.37	0.37		
	16-60	30-50	1.30-1.55	0.00-0.06	0.08-0.10	High	0.0-0.5	0.43	0.43		
272C:											
Attewan-----	0-5	10-20	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	5
	5-17	20-35	1.40-1.60	0.60-2.00	0.14-0.17	Moderate	1.0-2.0	0.32	0.32		
	17-27	15-30	1.40-1.60	0.60-2.00	0.13-0.15	Moderate	0.5-1.0	0.32	0.32		
	27-60	0-10	1.40-1.60	6.00-20.00	0.02-0.03	Low	0.0-0.5	0.05	0.24		
Tinsley-----	0-6	5-10	1.30-1.50	2.00-6.00	0.08-0.11	Low	0.7-2.0	0.10	0.20	5	3
	6-60	0-10	1.45-1.65	6.00-20.00	0.01-0.02	Low	0.0-0.5	0.05	0.17		
301A:											
Marvan-----	0-3	40-60	1.25-1.45	0.06-0.20	0.14-0.18	High	0.5-2.0	0.37	0.37	5	4
	3-46	45-60	1.30-1.50	0.00-0.06	0.11-0.13	High	0.5-1.0	0.37	0.37		
	46-60	45-60	1.30-1.50	0.00-0.06	0.09-0.11	High	0.0-0.5	0.37	0.37		
Vanda-----	0-7	40-60	1.25-1.45	0.00-0.06	0.08-0.12	High	0.5-2.0	0.43	0.43	5	4
	7-60	35-60	1.30-1.50	0.00-0.06	0.08-0.12	High	0.0-0.5	0.37	0.37		
301C:											
Marvan-----	0-3	40-60	1.25-1.45	0.06-0.20	0.14-0.18	High	0.5-2.0	0.37	0.37	5	4
	3-46	45-60	1.30-1.50	0.00-0.06	0.11-0.13	High	0.5-1.0	0.37	0.37		
	46-60	45-60	1.30-1.50	0.00-0.06	0.09-0.11	High	0.0-0.5	0.37	0.37		
Vanda-----	0-7	40-60	1.25-1.45	0.00-0.06	0.08-0.12	High	0.5-2.0	0.43	0.43	5	4
	7-60	35-60	1.30-1.50	0.00-0.06	0.08-0.12	High	0.0-0.5	0.37	0.37		
303A:											
Flatcreek-----	0-3	40-60	1.30-1.40	0.06-0.20	0.15-0.19	High	0.5-2.0	0.37	0.37	5	4
	3-11	40-60	1.35-1.45	0.06-0.20	0.13-0.17	High	0.5-2.0	0.37	0.37		
	11-20	40-60	1.35-1.45	0.01-0.06	0.10-0.14	High	0.5-1.0	0.37	0.37		
	20-60	40-60	1.35-1.45	0.01-0.06	0.10-0.14	High	0.0-0.5	0.37	0.37		
Nobe-----	0-2	40-60	1.20-1.40	0.06-0.20	0.11-0.13	High	0.5-2.0	0.43	0.43	5	4
	2-60	35-60	1.40-1.60	0.01-0.06	0.05-0.08	High	0.5-1.0	0.43	0.43		
305A:											
Marvan-----	0-7	40-60	1.25-1.45	0.06-0.20	0.11-0.15	High	0.5-1.0	0.37	0.37	5	4
	7-20	45-60	1.30-1.50	0.00-0.06	0.11-0.13	High	0.5-1.0	0.37	0.37		
	20-60	45-60	1.30-1.50	0.00-0.06	0.09-0.11	High	0.0-0.5	0.37	0.37		
Nobe-----	0-7	40-50	1.30-1.50	0.00-0.06	0.13-0.16	High	0.5-2.0	0.43	0.43	5	4
	7-20	35-60	1.30-1.50	0.00-0.06	0.06-0.07	High	0.5-1.0	0.43	0.43		
	20-60	35-60	1.30-1.55	0.00-0.06	0.06-0.07	High	0.0-0.5	0.43	0.43		
311B:											
Ferd-----	0-3	20-27	1.25-1.45	0.20-2.00	0.15-0.19	Low	0.5-1.0	0.43	0.43	5	6
	3-8	22-35	1.30-1.50	0.20-2.00	0.16-0.20	Low	0.5-1.0	0.37	0.37		
	8-13	35-50	1.30-1.50	0.06-0.20	0.15-0.19	High	0.5-1.0	0.37	0.37		
	13-32	27-40	1.30-1.50	0.06-0.20	0.14-0.18	Moderate	0.0-0.5	0.37	0.37		
	32-60	27-40	1.30-1.50	0.06-0.20	0.13-0.17	Moderate	0.0-0.5	0.37	0.37		

Physical Properties of the Soils--Continued

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
311B: (cont.)											
Creed-----	0-6	20-27	1.15-1.40	0.60-2.00	0.14-0.18	Low	1.0-3.0	0.43	0.43	2	6
	6-12	35-55	1.30-1.55	0.06-0.20	0.10-0.14	High	1.0-2.0	0.32	0.32		
	12-26	27-40	1.30-1.55	0.06-0.20	0.08-0.12	Moderate	0.0-0.5	0.37	0.37		
	26-60	25-35	1.30-1.55	0.06-0.20	0.08-0.12	Moderate	0.0-0.5	0.37	0.37		
Gerdrum-----	0-7	27-40	1.20-1.40	0.20-0.60	0.14-0.18	Moderate	1.0-3.0	0.43	0.43	2	6
	7-16	35-55	1.30-1.55	0.00-0.06	0.10-0.13	High	0.5-1.0	0.37	0.37		
	16-60	30-50	1.30-1.55	0.00-0.06	0.08-0.10	High	0.0-0.5	0.43	0.43		
311C:											
Ferd-----	0-3	20-27	1.25-1.45	0.20-2.00	0.15-0.19	Low	0.5-1.0	0.43	0.43	5	6
	3-8	22-35	1.30-1.50	0.20-2.00	0.16-0.20	Low	0.5-1.0	0.37	0.37		
	8-13	35-50	1.30-1.50	0.06-0.20	0.15-0.19	High	0.5-1.0	0.37	0.37		
	13-32	27-40	1.30-1.50	0.06-0.20	0.14-0.18	Moderate	0.0-0.5	0.37	0.37		
	32-60	27-40	1.30-1.50	0.06-0.20	0.13-0.17	Moderate	0.0-0.5	0.37	0.37		
Creed-----	0-6	20-27	1.15-1.40	0.60-2.00	0.14-0.18	Low	1.0-3.0	0.43	0.43	2	6
	6-12	35-55	1.30-1.55	0.06-0.20	0.10-0.14	High	1.0-2.0	0.32	0.32		
	12-26	27-40	1.30-1.55	0.06-0.20	0.08-0.12	Moderate	0.0-0.5	0.37	0.37		
	26-60	25-35	1.30-1.55	0.06-0.20	0.08-0.12	Moderate	0.0-0.5	0.37	0.37		
Gerdrum-----	0-7	27-40	1.20-1.40	0.20-0.60	0.14-0.18	Moderate	1.0-3.0	0.43	0.43	2	6
	7-16	35-55	1.30-1.55	0.00-0.06	0.10-0.13	High	0.5-1.0	0.37	0.37		
	16-60	30-50	1.30-1.55	0.00-0.06	0.08-0.10	High	0.0-0.5	0.43	0.43		
323B:											
Sagedale-----	0-4	35-40	1.20-1.40	0.06-0.20	0.16-0.20	Moderate	1.0-2.0	0.37	0.37	5	4
	4-15	32-45	1.30-1.50	0.06-0.20	0.15-0.18	Moderate	1.0-2.0	0.32	0.37		
	15-30	35-45	1.30-1.50	0.06-0.20	0.15-0.17	Moderate	0.5-1.0	0.32	0.37		
	30-60	35-45	1.30-1.55	0.06-0.20	0.14-0.16	Moderate	0.0-0.5	0.32	0.37		
323C:											
Sagedale-----	0-4	35-40	1.20-1.40	0.06-0.20	0.16-0.20	Moderate	1.0-2.0	0.37	0.37	5	4
	4-15	32-45	1.30-1.50	0.06-0.20	0.15-0.18	Moderate	1.0-2.0	0.32	0.37		
	15-30	35-45	1.30-1.50	0.06-0.20	0.15-0.17	Moderate	0.5-1.0	0.32	0.37		
	30-60	35-45	1.30-1.55	0.06-0.20	0.14-0.16	Moderate	0.0-0.5	0.32	0.37		
324B:											
Marcott-----	0-4	35-40	1.05-1.25	0.20-0.60	0.15-0.19	Moderate	3.0-5.0	0.28	0.32	5	4
	4-15	35-50	1.15-1.35	0.06-0.20	0.13-0.18	Moderate	1.0-3.0	0.37	0.37		
	15-30	35-50	1.25-1.45	0.06-0.20	0.11-0.16	Moderate	0.5-1.0	0.37	0.37		
	30-60	35-50	1.30-1.45	0.06-0.20	0.11-0.16	Moderate	0.0-0.5	0.37	0.37		
331B:											
Phillips-----	0-8	15-27	1.15-1.35	0.20-2.00	0.16-0.20	Low	1.0-3.0	0.43	0.43	5	5
	8-15	35-45	1.20-1.40	0.06-0.20	0.14-0.18	Moderate	1.0-2.0	0.37	0.37		
	15-32	25-40	1.30-1.50	0.06-0.20	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	32-60	25-40	1.50-1.75	0.06-0.20	0.13-0.17	Moderate	0.0-0.5	0.37	0.37		
Elloam-----	0-7	27-35	1.25-1.40	0.60-2.00	0.12-0.18	Moderate	1.0-2.0	0.43	0.43	2	6
	7-12	35-55	1.40-1.60	0.06-0.20	0.10-0.14	High	0.5-1.0	0.43	0.43		
	12-18	30-45	1.40-1.60	0.00-0.06	0.10-0.14	Moderate	0.0-0.5	0.43	0.43		
	18-60	25-40	1.40-1.65	0.00-0.06	0.08-0.12	Moderate	0.0-0.5	0.43	0.43		
331C:											
Phillips-----	0-8	15-27	1.15-1.35	0.20-2.00	0.16-0.20	Low	1.0-3.0	0.43	0.43	5	5
	8-15	35-45	1.20-1.40	0.06-0.20	0.14-0.18	Moderate	1.0-2.0	0.37	0.37		
	15-32	25-40	1.30-1.50	0.06-0.20	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	32-60	25-40	1.50-1.75	0.06-0.20	0.13-0.17	Moderate	0.0-0.5	0.37	0.37		

Physical Properties of the Soils--Continued

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
331C: (cont.)											
Elloam-----	0-7	27-35	1.25-1.40	0.60-2.00	0.12-0.18	Moderate	1.0-2.0	0.43	0.43	2	6
	7-12	35-55	1.40-1.60	0.06-0.20	0.10-0.14	High	0.5-1.0	0.43	0.43		
	12-18	30-45	1.40-1.60	0.00-0.06	0.10-0.14	Moderate	0.0-0.5	0.43	0.43		
	18-60	25-40	1.40-1.65	0.00-0.06	0.08-0.12	Moderate	0.0-0.5	0.43	0.43		
334B:											
Phillips-----	0-8	15-27	1.15-1.35	0.20-2.00	0.16-0.20	Low	1.0-3.0	0.43	0.43	5	5
	8-15	35-45	1.20-1.40	0.06-0.20	0.14-0.18	Moderate	1.0-2.0	0.37	0.37		
	15-32	25-40	1.30-1.50	0.06-0.20	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	32-60	25-40	1.50-1.75	0.06-0.20	0.13-0.17	Moderate	0.0-0.5	0.37	0.37		
Kevin-----	0-6	27-32	1.20-1.40	0.60-2.00	0.14-0.18	Moderate	1.0-3.0	0.37	0.37	5	6
	6-9	35-45	1.30-1.50	0.20-0.60	0.15-0.19	High	1.0-3.0	0.37	0.37		
	9-31	27-35	1.30-1.60	0.20-0.60	0.15-0.19	Moderate	0.5-1.0	0.37	0.37		
	31-60	27-35	1.60-1.80	0.06-0.20	0.12-0.15	Moderate	0.0-0.5	0.37	0.37		
341B:											
Linnet-----	0-7	40-45	1.15-1.35	0.06-0.20	0.14-0.18	High	1.0-3.0	0.32	0.32	5	4
	7-14	45-60	1.30-1.50	0.06-0.20	0.13-0.16	High	0.5-1.0	0.32	0.32		
	14-36	35-50	1.30-1.50	0.06-0.20	0.13-0.16	High	0.5-1.0	0.32	0.32		
	36-60	35-50	1.30-1.55	0.06-0.20	0.12-0.15	High	0.0-0.5	0.32	0.32		
Marias-----	0-6	40-60	1.25-1.45	0.06-0.20	0.14-0.18	High	0.5-2.0	0.37	0.37	5	4
	6-38	40-60	1.30-1.50	0.00-0.06	0.12-0.16	High	0.5-1.0	0.37	0.37		
	38-60	40-60	1.30-1.55	0.00-0.06	0.12-0.16	High	0.0-0.5	0.37	0.37		
351B:											
Kenilworth-----	0-5	5-18	1.30-1.50	2.00-6.00	0.12-0.16	Low	1.0-2.0	0.32	0.32	5	3
	5-12	15-30	1.40-1.60	0.60-2.00	0.13-0.17	Low	0.5-1.0	0.37	0.37		
	12-16	20-35	1.40-1.60	0.06-0.20	0.16-0.20	Moderate	0.5-1.0	0.37	0.37		
	16-29	27-35	1.30-1.50	0.06-0.20	0.16-0.20	Moderate	0.0-0.5	0.37	0.37		
	29-60	27-35	1.30-1.50	0.06-0.20	0.16-0.20	Moderate	0.0-0.5	0.37	0.37		
Fortbenton-----	0-7	10-18	1.40-1.60	2.00-6.00	0.13-0.16	Low	1.0-2.0	0.32	0.32	5	3
	7-24	10-18	1.45-1.65	2.00-6.00	0.12-0.15	Low	0.5-1.0	0.32	0.32		
	24-60	27-35	1.30-1.50	0.06-0.20	0.16-0.20	Moderate	0.0-0.5	0.37	0.37		
361B:											
Fortbenton-----	0-6	10-18	1.40-1.60	2.00-6.00	0.13-0.16	Low	1.0-2.0	0.32	0.32	5	3
	6-23	10-18	1.45-1.65	2.00-6.00	0.12-0.15	Low	0.5-1.0	0.32	0.32		
	23-60	27-35	1.30-1.50	0.06-0.20	0.16-0.20	Moderate	0.0-0.5	0.37	0.37		
362C:											
Chinook-----	0-5	5-18	1.25-1.45	2.00-6.00	0.13-0.16	Low	1.0-2.0	0.20	0.20	5	3
	5-24	5-18	1.40-1.60	2.00-6.00	0.12-0.15	Low	0.0-1.0	0.20	0.20		
	24-60	5-15	1.40-1.60	2.00-6.00	0.11-0.12	Low	0.0-1.0	0.20	0.20		
Yetull-----	0-6	0-10	1.35-1.55	6.00-20.00	0.05-0.08	Low	1.0-2.0	0.20	0.20	5	2
	6-60	0-10	1.45-1.65	6.00-20.00	0.05-0.07	Low	0.0-1.0	0.20	0.20		
363B:											
Cozberg-----	0-6	10-20	1.20-1.40	2.00-6.00	0.13-0.16	Low	2.0-4.0	0.20	0.20	3	3
	6-34	10-18	1.30-1.55	2.00-6.00	0.13-0.16	Low	0.5-2.0	0.20	0.20		
	34-60	0-10	1.45-1.65	6.00-20.00	0.04-0.06	Low	0.0-0.5	0.17	0.17		
Chinook-----	0-5	5-18	1.25-1.45	2.00-6.00	0.13-0.16	Low	1.0-2.0	0.20	0.20	5	3
	5-24	5-18	1.40-1.60	2.00-6.00	0.12-0.15	Low	0.0-1.0	0.20	0.20		
	24-60	5-15	1.40-1.60	2.00-6.00	0.11-0.12	Low	0.0-1.0	0.20	0.20		

Physical Properties of the Soils--Continued

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Erosion factors				Wind erodi- bility group
							Organic matter	K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
363C:											
Chinook-----	0-5	5-18	1.25-1.45	2.00-6.00	0.13-0.16	Low	1.0-2.0	0.20	0.20	5	3
	5-24	5-18	1.40-1.60	2.00-6.00	0.12-0.15	Low	0.0-1.0	0.20	0.20		
	24-60	5-15	1.40-1.60	2.00-6.00	0.11-0.12	Low	0.0-1.0	0.20	0.20		
Lihen-----	0-12	10-20	1.30-1.50	6.00-20.00	0.13-0.16	Low	1.0-2.0	0.20	0.20	5	3
	12-60	0-10	1.40-1.65	6.00-20.00	0.07-0.09	Low	0.0-0.5	0.17	0.17		
364B:											
Chinook-----	0-11	15-20	1.20-1.40	0.60-2.00	0.15-0.19	Low	1.0-2.0	0.32	0.32	5	5
	11-35	5-18	1.40-1.60	2.00-6.00	0.12-0.15	Low	0.0-1.0	0.20	0.20		
	35-60	5-15	1.40-1.60	2.00-6.00	0.11-0.12	Low	0.0-1.0	0.20	0.20		
364C:											
Chinook-----	0-11	15-20	1.20-1.40	0.60-2.00	0.15-0.19	Low	1.0-2.0	0.32	0.32	5	5
	11-35	5-18	1.40-1.60	2.00-6.00	0.12-0.15	Low	0.0-1.0	0.20	0.20		
	35-60	5-15	1.40-1.60	2.00-6.00	0.11-0.12	Low	0.0-1.0	0.20	0.20		
365B:											
Fortbenton-----	0-6	10-18	1.40-1.60	2.00-6.00	0.13-0.16	Low	1.0-2.0	0.32	0.32	5	3
	6-23	10-18	1.45-1.65	2.00-6.00	0.12-0.15	Low	0.5-1.0	0.32	0.32		
	23-60	27-35	1.30-1.50	0.06-0.20	0.16-0.20	Moderate	0.0-0.5	0.37	0.37		
Chinook-----	0-5	5-18	1.25-1.45	2.00-6.00	0.13-0.16	Low	1.0-2.0	0.20	0.20	5	3
	5-24	5-18	1.40-1.60	2.00-6.00	0.12-0.15	Low	0.0-1.0	0.20	0.20		
	24-60	5-15	1.40-1.60	2.00-6.00	0.11-0.12	Low	0.0-1.0	0.20	0.20		
368C:											
Fortbenton-----	0-7	10-18	1.40-1.60	2.00-6.00	0.13-0.16	Low	1.0-2.0	0.32	0.32	5	3
	7-24	10-18	1.45-1.65	2.00-6.00	0.12-0.15	Low	0.5-1.0	0.32	0.32		
	24-60	27-35	1.30-1.50	0.06-0.20	0.16-0.20	Moderate	0.0-0.5	0.37	0.37		
Hillon-----	0-4	20-27	1.20-1.40	0.60-2.00	0.18-0.20	Low	0.5-2.0	0.43	0.43	5	4L
	4-60	20-35	1.50-1.75	0.06-0.20	0.15-0.18	Moderate	0.0-0.5	0.43	0.43		
372C:											
Evanston-----	0-6	20-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	5	6
	6-14	25-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	14-25	20-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	25-60	15-30	1.35-1.55	0.60-2.00	0.16-0.18	Moderate	0.0-0.5	0.37	0.37		
Yamacall-----	0-5	18-27	1.20-1.40	0.60-2.00	0.14-0.18	Low	1.0-3.0	0.37	0.37	5	4L
	5-38	18-35	1.30-1.50	0.60-2.00	0.16-0.20	Moderate	0.5-1.0	0.37	0.37		
	38-60	15-35	1.25-1.45	0.60-2.00	0.14-0.18	Low	0.0-0.5	0.32	0.32		
375B:											
Evanston-----	0-6	20-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	5	6
	6-12	25-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	12-60	27-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
Lonna-----	0-7	18-27	1.10-1.30	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	5	4L
	7-16	18-35	1.25-1.45	0.60-2.00	0.16-0.20	Moderate	0.5-1.0	0.37	0.37		
	16-30	18-35	1.25-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	30-60	10-35	1.25-1.50	0.60-2.00	0.12-0.16	Moderate	0.0-0.5	0.37	0.37		
377B:											
Evanston-----	0-6	20-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	5	6
	6-14	25-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	14-25	20-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	25-60	15-30	1.35-1.55	0.60-2.00	0.16-0.18	Moderate	0.0-0.5	0.37	0.37		

Physical Properties of the Soils--Continued

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
377B: (cont.)											
Degrad-----	0-6	10-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	2.0-3.0	0.37	0.37	3	5
	6-11	20-35	1.40-1.60	0.60-2.00	0.13-0.16	Moderate	1.0-2.0	0.32	0.32		
	11-28	15-30	1.35-1.60	0.60-2.00	0.13-0.16	Low	0.5-1.0	0.32	0.32		
	28-60	0-5	1.50-1.70	6.00-20.00	0.03-0.04	Low	0.0-0.5	0.10	0.15		
381B:											
Ethridge-----	0-5	27-35	1.15-1.35	0.20-0.60	0.16-0.20	Moderate	1.0-3.0	0.37	0.37	5	6
	5-12	35-45	1.30-1.50	0.06-0.20	0.15-0.19	High	1.0-2.0	0.32	0.32		
	12-38	30-45	1.30-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37		
	38-60	27-40	1.30-1.50	0.06-0.20	0.14-0.18	Moderate	0.0-0.5	0.37	0.37		
385B:											
Ethridge-----	0-6	27-35	1.15-1.35	0.20-0.60	0.16-0.20	Moderate	1.0-3.0	0.37	0.37	5	7
	6-14	35-45	1.30-1.50	0.06-0.20	0.15-0.19	High	1.0-2.0	0.32	0.32		
	14-32	30-45	1.30-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37		
	32-60	27-40	1.30-1.50	0.06-0.20	0.14-0.18	Moderate	0.0-0.5	0.37	0.37		
Kobase-----	0-6	35-40	1.20-1.40	0.06-0.20	0.14-0.18	Moderate	1.0-2.0	0.37	0.37	5	4
	6-25	35-45	1.25-1.45	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37		
	25-60	35-45	1.30-1.50	0.06-0.20	0.14-0.18	High	0.0-0.5	0.37	0.37		
386B:											
Ethridge-----	0-6	27-35	1.15-1.35	0.20-0.60	0.16-0.20	Moderate	1.0-3.0	0.37	0.37	5	7
	6-14	35-45	1.30-1.50	0.06-0.20	0.15-0.19	High	1.0-2.0	0.32	0.32		
	14-32	30-45	1.30-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37		
	32-60	25-40	1.30-1.50	0.06-0.20	0.14-0.18	Moderate	0.0-0.5	0.37	0.37		
Evanston-----	0-6	20-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	5	6
	6-14	25-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	14-25	20-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	25-60	15-30	1.35-1.55	0.60-2.00	0.16-0.18	Moderate	0.0-0.5	0.37	0.37		
388A:											
Ethridge-----	0-6	27-35	1.15-1.35	0.20-0.60	0.16-0.20	Moderate	1.0-3.0	0.37	0.37	5	7
	6-14	35-45	1.30-1.50	0.06-0.20	0.15-0.19	High	1.0-2.0	0.32	0.32		
	14-32	30-45	1.30-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37		
	32-60	27-40	1.30-1.50	0.06-0.20	0.14-0.18	Moderate	0.0-0.5	0.37	0.37		
Lonna-----	0-6	27-35	1.15-1.35	0.60-2.00	0.16-0.20	Moderate	1.0-3.0	0.32	0.32	5	4L
	6-11	18-35	1.25-1.45	0.60-2.00	0.16-0.20	Moderate	0.5-1.0	0.37	0.37		
	11-34	18-35	1.25-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	34-60	10-35	1.25-1.50	0.60-2.00	0.12-0.16	Moderate	0.0-0.5	0.37	0.37		
402A:											
Gerdum-----	0-7	27-40	1.20-1.40	0.20-0.60	0.14-0.18	Moderate	1.0-3.0	0.43	0.43	2	6
	7-16	35-55	1.30-1.55	0.00-0.06	0.10-0.13	High	0.5-1.0	0.37	0.37		
	16-60	30-50	1.30-1.55	0.00-0.06	0.08-0.10	High	0.0-0.5	0.43	0.43		
Absher-----	0-7	40-55	1.20-1.40	0.00-0.06	0.10-0.13	High	1.0-2.0	0.43	0.43	2	4
	7-11	35-60	1.35-1.60	0.00-0.06	0.08-0.10	High	0.5-1.0	0.37	0.37		
	11-60	35-50	1.30-1.55	0.00-0.06	0.05-0.07	High	0.0-0.5	0.43	0.43		
Creed-----	0-6	20-27	1.15-1.40	0.60-2.00	0.14-0.18	Low	1.0-3.0	0.43	0.43	2	6
	6-12	35-55	1.30-1.55	0.06-0.20	0.10-0.14	High	1.0-2.0	0.32	0.32		
	12-26	27-40	1.30-1.55	0.06-0.20	0.08-0.12	Moderate	0.0-0.5	0.37	0.37		
	26-60	25-35	1.30-1.55	0.06-0.20	0.08-0.12	Moderate	0.0-0.5	0.37	0.37		

Physical Properties of the Soils--Continued

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
410: Rock outcrop----											
Fleak-----	0-3	0-10	1.20-1.50	6.00-20.00	0.08-0.10	Low	0.5-1.0	0.20	0.20	2	2
	3-18	0-10	1.20-1.50	6.00-20.00	0.06-0.07	Low	0.0-0.5	0.20	0.20		
	18-60	---	---	---	---	---	---	---	---		
411D: Farnuf-----	0-6	15-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	2.0-4.0	0.32	0.32	5	6
	6-18	25-35	1.25-1.45	0.60-2.00	0.14-0.18	Moderate	1.0-3.0	0.32	0.32		
	18-46	20-30	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.32	0.32		
	46-60	15-30	1.30-1.50	0.60-2.00	0.12-0.16	Low	0.0-0.5	0.20	0.32		
Reeder-----	0-7	15-27	1.10-1.30	0.60-2.00	0.18-0.22	Low	2.0-4.0	0.32	0.32	3	6
	7-12	18-35	1.30-1.50	0.60-2.00	0.14-0.17	Moderate	1.0-2.0	0.37	0.37		
	12-34	15-30	1.30-1.50	0.60-2.00	0.14-0.17	Low	0.5-1.0	0.37	0.37		
	34-60	---	---	---	---	---	---	---	---		
411E: Reeder-----	0-7	15-27	1.10-1.30	0.60-2.00	0.18-0.22	Low	2.0-4.0	0.32	0.32	3	6
	7-12	18-35	1.30-1.50	0.60-2.00	0.14-0.17	Moderate	1.0-2.0	0.37	0.37		
	12-34	15-30	1.30-1.50	0.60-2.00	0.14-0.17	Low	0.5-1.0	0.32	0.37		
	34-60	---	---	---	---	---	---	---	---		
Farnuf-----	0-6	15-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	2.0-4.0	0.32	0.32	5	6
	6-18	25-35	1.25-1.45	0.60-2.00	0.14-0.18	Moderate	1.0-3.0	0.32	0.32		
	18-46	20-30	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.32	0.32		
	46-60	15-30	1.30-1.50	0.60-2.00	0.12-0.16	Low	0.0-0.5	0.20	0.32		
421C: Joplin-----	0-6	18-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.43	0.43	5	6
	6-9	25-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	1.0-2.0	0.37	0.37		
	9-38	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.28	0.37		
	38-60	18-32	1.60-1.80	0.06-0.20	0.13-0.16	Moderate	0.0-0.5	0.28	0.37		
Hillon-----	0-4	20-27	1.20-1.40	0.60-2.00	0.18-0.20	Low	0.5-2.0	0.43	0.43	5	4L
	4-60	20-35	1.50-1.75	0.06-0.20	0.15-0.18	Moderate	0.0-0.5	0.43	0.43		
422C: Marmarth-----	0-7	20-27	1.10-1.30	0.60-2.00	0.18-0.22	Low	1.0-3.0	0.37	0.37	3	6
	7-11	18-35	1.35-1.60	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.32	0.32		
	11-30	15-30	1.35-1.60	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.32	0.32		
	30-60	---	---	---	---	---	---	---	---		
441C: Kevin-----	0-6	27-32	1.20-1.40	0.60-2.00	0.14-0.18	Moderate	1.0-3.0	0.37	0.37	5	6
	6-9	35-45	1.30-1.50	0.20-0.60	0.15-0.19	High	1.0-3.0	0.37	0.37		
	9-31	27-35	1.30-1.60	0.20-0.60	0.15-0.19	Moderate	0.5-1.0	0.37	0.37		
	31-60	27-35	1.60-1.80	0.06-0.20	0.12-0.15	Moderate	0.0-0.5	0.37	0.37		
Hillon-----	0-4	27-35	1.25-1.35	0.60-2.00	0.15-0.18	Moderate	0.5-2.0	0.37	0.37	5	4L
	4-60	20-35	1.50-1.75	0.06-0.20	0.15-0.18	Moderate	0.0-0.5	0.43	0.43		
442C: Kevin-----	0-6	27-32	1.20-1.40	0.60-2.00	0.14-0.18	Moderate	1.0-3.0	0.37	0.37	5	6
	6-9	35-45	1.30-1.50	0.20-0.60	0.15-0.19	High	1.0-3.0	0.37	0.37		
	9-31	27-35	1.30-1.60	0.20-0.60	0.15-0.19	Moderate	0.5-1.0	0.37	0.37		
	31-60	27-35	1.60-1.80	0.06-0.20	0.12-0.15	Moderate	0.0-0.5	0.37	0.37		

Physical Properties of the Soils--Continued

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
442C: (cont.)											
Elloam-----	0-7	27-35	1.25-1.40	0.60-2.00	0.12-0.18	Moderate	1.0-2.0	0.43	0.43	2	6
	7-12	35-55	1.40-1.60	0.06-0.20	0.10-0.14	High	0.5-1.0	0.43	0.43		
	12-18	30-45	1.40-1.60	0.00-0.06	0.10-0.14	Moderate	0.0-0.5	0.43	0.43		
	18-60	25-40	1.40-1.65	0.00-0.06	0.08-0.12	Moderate	0.0-0.5	0.43	0.43		
444D:											
Kevin-----	0-6	27-32	1.20-1.40	0.60-2.00	0.14-0.18	Moderate	1.0-3.0	0.37	0.37	5	6
	6-9	35-45	1.30-1.50	0.20-0.60	0.15-0.19	High	1.0-3.0	0.37	0.37		
	9-31	27-35	1.30-1.60	0.20-0.60	0.15-0.19	Moderate	0.5-1.0	0.37	0.37		
	31-60	27-35	1.60-1.80	0.06-0.20	0.12-0.15	Moderate	0.0-0.5	0.37	0.37		
Scobey-----	0-6	27-35	1.15-1.35	0.60-2.00	0.16-0.18	Moderate	1.0-3.0	0.37	0.37	5	6
	6-15	35-45	1.30-1.50	0.20-0.60	0.15-0.18	High	0.5-1.0	0.32	0.32		
	15-60	30-40	1.35-1.65	0.06-0.20	0.15-0.18	Moderate	0.0-0.5	0.37	0.37		
451C:											
Turner-----	0-4	15-25	1.10-1.30	0.60-2.00	0.15-0.19	Low	2.0-4.0	0.32	0.32	3	6
	4-16	25-35	1.30-1.50	0.60-2.00	0.12-0.18	Moderate	0.5-2.0	0.24	0.32		
	16-34	20-35	1.35-1.50	0.60-2.00	0.12-0.18	Moderate	0.0-0.5	0.24	0.37		
	34-60	0-5	1.35-1.50	6.00-20.00	0.01-0.06	Low	0.0-0.5	0.05	0.20		
Beaverton-----	0-4	20-27	1.25-1.50	0.60-2.00	0.07-0.09	Low	1.0-3.0	0.10	0.37	2	6
	4-15	25-35	1.40-1.60	0.60-2.00	0.08-0.10	Low	0.5-1.0	0.10	0.37		
	15-60	0-10	1.55-1.75	6.00-20.00	0.03-0.04	Low	0.0-0.5	0.02	0.10		
Beaverton-----	0-5	20-27	1.15-1.35	0.60-2.00	0.14-0.16	Low	1.0-3.0	0.20	0.37	2	6
	5-18	25-35	1.50-1.70	0.60-2.00	0.08-0.10	Low	0.5-1.0	0.10	0.32		
	18-60	0-10	1.50-1.75	6.00-20.00	0.03-0.04	Low	0.0-0.5	0.02	0.10		
460:											
Lacey Creek-----	0-18	15-24	1.10-1.30	0.60-2.00	0.17-0.20	Low	4.0-8.0	0.28	0.28	5	5
	18-26	24-35	1.20-1.40	0.60-2.00	0.16-0.19	Moderate	1.0-3.0	0.37	0.37		
	26-44	20-35	1.30-1.50	0.60-2.00	0.15-0.18	Moderate	1.0-3.0	0.32	0.32		
	44-60	5-20	1.35-1.55	2.00-6.00	0.12-0.16	Low	0.5-1.0	0.37	0.37		
471B:											
Marias-----	0-6	40-60	1.25-1.45	0.06-0.20	0.14-0.18	High	0.5-2.0	0.37	0.37	5	4
	6-38	40-60	1.30-1.50	0.00-0.06	0.12-0.16	High	0.5-1.0	0.37	0.37		
	38-60	40-60	1.30-1.55	0.00-0.06	0.12-0.16	High	0.0-0.5	0.37	0.37		
Kobase-----	0-6	35-40	1.20-1.40	0.06-0.20	0.14-0.18	Moderate	1.0-2.0	0.37	0.37	5	4
	6-25	35-45	1.25-1.45	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37		
	25-60	35-45	1.30-1.50	0.06-0.20	0.14-0.18	High	0.0-0.5	0.37	0.37		
481A:											
Bigsag-----	0-4	40-60	1.35-1.50	0.06-0.20	0.07-0.10	High	0.5-1.0	0.43	0.43	5	4
	4-15	35-60	1.35-1.50	0.00-0.06	0.07-0.10	High	0.0-0.5	0.37	0.37		
	15-60	35-60	1.35-1.50	0.00-0.06	0.07-0.10	High	0.0-0.5	0.37	0.37		
493A:											
Enbar-----	0-18	18-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	3.0-5.0	0.28	0.28	4	6
	18-30	18-30	1.30-1.50	0.60-2.00	0.14-0.16	Low	1.0-3.0	0.37	0.37		
	30-52	10-27	1.35-1.55	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.37	0.37		
	52-60	5-18	1.50-1.70	2.00-6.00	0.04-0.05	Low	0.0-0.5	0.05	0.20		
Straw-----	0-8	20-27	1.10-1.25	0.60-2.00	0.16-0.20	Low	3.0-5.0	0.28	0.28	5	6
	8-60	22-35	1.20-1.40	0.60-2.00	0.16-0.19	Moderate	1.0-3.0	0.37	0.37		

Physical Properties of the Soils--Continued

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
493A: (cont.)											
Eagleton-----	0-6	18-27	1.10-1.30	0.60-2.00	0.17-0.21	Low	4.0-6.0	0.28	0.28	5	6
	6-38	18-35	1.10-1.30	0.60-2.00	0.16-0.20	Low	3.0-5.0	0.37	0.37		
	38-60	18-35	1.20-1.40	0.60-2.00	0.15-0.19	Low	1.0-2.0	0.37	0.37		
503B:											
Telstad-----	0-5	18-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.43	0.43	5	6
	5-14	25-35	1.25-1.45	0.20-0.60	0.16-0.19	Moderate	1.0-2.0	0.37	0.37		
	14-38	20-32	1.30-1.50	0.20-0.60	0.15-0.18	Moderate	0.5-1.0	0.37	0.37		
	38-60	20-32	1.50-1.75	0.06-0.20	0.14-0.17	Moderate	0.0-0.5	0.37	0.37		
Joplin-----	0-6	18-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.43	0.43	5	6
	6-9	25-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	1.0-2.0	0.37	0.37		
	9-38	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.28	0.37		
	38-60	18-32	1.60-1.80	0.06-0.20	0.13-0.16	Moderate	0.0-0.5	0.28	0.37		
503C:											
Telstad-----	0-5	18-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.43	0.43	5	6
	5-14	25-35	1.25-1.45	0.20-0.60	0.16-0.19	Moderate	1.0-2.0	0.37	0.37		
	14-38	20-32	1.30-1.50	0.20-0.60	0.15-0.18	Moderate	0.5-1.0	0.37	0.37		
	38-60	20-32	1.50-1.75	0.06-0.20	0.14-0.17	Moderate	0.0-0.5	0.37	0.37		
Joplin-----	0-6	10-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.43	0.43	5	6
	6-9	25-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	1.0-2.0	0.37	0.37		
	9-38	18-22	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.28	0.37		
	38-60	18-32	1.60-1.80	0.06-0.20	0.13-0.16	Moderate	0.0-0.5	0.28	0.37		
510:											
Rock outcrop----											
Belain-----	0-6	5-15	1.25-1.45	2.00-6.00	0.10-0.14	Low	2.0-4.0	0.20	0.20	2	3
	6-13	10-18	1.35-1.55	0.60-2.00	0.12-0.15	Low	1.0-2.0	0.24	0.32		
	13-24	10-18	1.35-1.55	2.00-6.00	0.11-0.13	Low	0.5-1.0	0.20	0.37		
	24-60	---	---	---	---	---	---	---	---		
511A:											
Martinsdale----	0-4	18-27	1.20-1.40	0.60-2.00	0.18-0.20	Low	2.0-4.0	0.32	0.32	4	6
	4-18	25-35	1.30-1.50	0.20-0.60	0.15-0.18	Moderate	1.0-3.0	0.37	0.37		
	18-40	20-35	1.40-1.60	0.20-0.60	0.13-0.16	Moderate	0.5-1.0	0.37	0.37		
	40-60	15-30	1.50-1.70	0.20-0.60	0.10-0.12	Low	0.0-0.5	0.15	0.37		
Turner-----	0-4	15-25	1.10-1.30	0.60-2.00	0.15-0.19	Low	2.0-4.0	0.32	0.32	3	6
	4-16	25-35	1.30-1.50	0.60-2.00	0.12-0.18	Moderate	0.5-2.0	0.24	0.32		
	16-34	20-35	1.35-1.50	0.60-2.00	0.12-0.18	Moderate	0.0-0.5	0.24	0.37		
	34-60	0-5	1.35-1.50	6.00-20.00	0.01-0.06	Low	0.0-0.5	0.05	0.20		
511C:											
Martinsdale----	0-4	18-27	1.20-1.40	0.60-2.00	0.18-0.20	Low	2.0-4.0	0.32	0.32	4	6
	4-18	25-35	1.30-1.50	0.20-0.60	0.15-0.18	Moderate	1.0-3.0	0.37	0.37		
	18-40	20-35	1.40-1.60	0.20-0.60	0.13-0.16	Moderate	0.5-1.0	0.37	0.37		
	40-60	15-30	1.50-1.70	0.20-0.60	0.10-0.12	Low	0.0-0.5	0.15	0.37		
512C:											
Martinsdale----	0-8	18-27	1.10-1.30	0.60-2.00	0.11-0.16	Low	2.0-4.0	0.20	0.37	4	6
	8-20	25-35	1.30-1.50	0.20-0.60	0.14-0.19	Moderate	1.0-3.0	0.37	0.37		
	20-42	15-35	1.35-1.45	0.20-0.60	0.13-0.18	Moderate	0.0-0.5	0.37	0.37		
	42-60	15-30	1.30-1.60	0.20-0.60	0.10-0.15	Low	0.0-0.5	0.17	---		

Physical Properties of the Soils--Continued

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
521B:											
Thoeny-----	0-6	15-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-2.0	0.49	0.49	2	5
	6-14	35-50	1.30-1.50	0.00-0.06	0.12-0.14	High	0.5-1.0	0.37	0.37		
	14-34	35-50	1.30-1.50	0.00-0.06	0.12-0.14	Moderate	0.5-1.0	0.43	0.43		
	34-60	27-40	1.50-1.75	0.00-0.06	0.10-0.12	Moderate	0.0-0.5	0.43	0.43		
Elloam-----	0-7	27-35	1.25-1.40	0.60-2.00	0.12-0.18	Moderate	1.0-2.0	0.43	0.43	2	6
	7-12	35-55	1.40-1.60	0.06-0.20	0.10-0.14	High	0.5-1.0	0.43	0.43		
	12-18	30-45	1.40-1.60	0.00-0.06	0.10-0.14	Moderate	0.0-0.5	0.43	0.43		
	18-60	25-40	1.40-1.65	0.00-0.06	0.08-0.12	Moderate	0.0-0.5	0.43	0.43		
Absher-----	0-7	40-55	1.20-1.40	0.00-0.06	0.10-0.13	High	1.0-2.0	0.43	0.43	2	4
	7-11	35-60	1.35-1.60	0.00-0.06	0.08-0.10	High	0.5-1.0	0.37	0.37		
	11-60	35-50	1.30-1.55	0.00-0.06	0.05-0.07	High	0.0-0.5	0.43	0.43		
530F:											
Warwood-----	0-4	20-27	1.20-1.40	0.60-2.00	0.14-0.18	Low	1.0-2.0	0.37	0.37	5	6
	4-8	15-27	1.40-1.60	0.60-2.00	0.12-0.16	Low	0.5-1.0	0.32	0.32		
	8-15	20-35	1.40-1.60	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.32	0.32		
	15-24	27-35	1.35-1.55	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.32	0.32		
	24-60	20-35	1.40-1.60	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.32	0.32		
531A:											
Sweetgrass-----	0-6	27-35	1.10-1.30	0.60-2.00	0.14-0.18	Moderate	3.0-5.0	0.28	0.28	2	6
	6-18	35-50	1.20-1.40	0.20-0.60	0.14-0.18	Moderate	1.0-2.0	0.32	0.32		
	18-25	10-30	1.40-1.60	0.60-2.00	0.14-0.16	Low	0.5-1.0	0.20	0.37		
	25-60	5-15	1.50-1.70	6.00-20.00	0.02-0.03	Low	0.0-0.5	0.02	0.15		
Beaverton-----	0-4	20-27	1.25-1.50	0.60-2.00	0.07-0.09	Low	1.0-3.0	0.10	0.37	2	6
	4-15	25-35	1.40-1.60	0.60-2.00	0.08-0.10	Low	0.5-1.0	0.10	0.37		
	15-60	0-10	1.55-1.75	6.00-20.00	0.03-0.04	Low	0.0-0.5	0.02	0.10		
531C:											
Sweetgrass-----	0-6	27-35	1.10-1.30	0.60-2.00	0.14-0.18	Moderate	3.0-5.0	0.28	0.28	2	6
	6-18	35-50	1.20-1.40	0.20-0.60	0.14-0.18	Moderate	1.0-2.0	0.32	0.32		
	18-25	10-30	1.40-1.60	0.60-2.00	0.14-0.16	Low	0.5-1.0	0.20	0.37		
	25-60	0-10	1.50-1.70	6.00-20.00	0.02-0.03	Low	0.0-0.5	0.02	0.15		
Beaverton-----	0-4	20-27	1.25-1.50	0.60-2.00	0.07-0.09	Low	1.0-3.0	0.10	0.37	2	6
	4-15	25-35	1.40-1.60	0.60-2.00	0.08-0.10	Low	0.5-1.0	0.10	0.37		
	15-60	0-10	1.55-1.75	6.00-20.00	0.03-0.04	Low	0.0-0.5	0.02	0.10		
Beaverton-----	0-5	20-27	1.15-1.35	0.60-2.00	0.14-0.16	Low	1.0-3.0	0.20	0.37	2	6
	5-18	25-35	1.50-1.70	0.60-2.00	0.08-0.10	Low	0.5-1.0	0.10	0.32		
	18-60	0-10	1.50-1.75	6.00-20.00	0.03-0.04	Low	0.0-0.5	0.02	0.10		
550F:											
Libeg-----	0-8	15-27	1.15-1.35	0.60-2.00	0.12-0.14	Low	2.0-4.0	0.15	0.37	5	6
	8-14	15-35	1.30-1.50	0.60-2.00	0.07-0.08	Low	1.0-2.0	0.10	0.37		
	14-48	20-35	1.40-1.60	0.60-2.00	0.07-0.08	Low	0.5-1.0	0.10	0.37		
	48-60	10-20	1.40-1.60	0.60-2.00	0.05-0.06	Low	0.0-0.5	0.05	0.37		
Arrowpeak-----	0-8	10-20	1.05-1.25	2.00-6.00	0.07-0.13	Low	2.0-6.0	0.10	0.37	1	5
	8-17	10-20	1.10-1.30	2.00-6.00	0.04-0.10	Low	2.0-4.0	0.05	0.37		
	17-60	---	---	---	---	---	---	---	---		
Elkner-----	0-5	5-10	1.20-1.40	2.00-6.00	0.13-0.15	Low	3.0-5.0	0.20	0.20	5	3
	5-32	5-10	1.35-1.60	2.00-6.00	0.10-0.12	Low	1.0-2.0	0.10	0.15		
	32-60	0-5	1.40-1.65	2.00-6.00	0.07-0.08	Low	0.5-1.0	0.05	0.05		

Physical Properties of the Soils--Continued

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
551B:											
Lonesome-----	0-6	5-15	1.45-1.65	6.00-20.00	0.08-0.10	Low	0.5-1.0	0.28	0.28	5	2
	6-32	5-15	1.50-1.70	6.00-20.00	0.08-0.10	Low	0.5-1.0	0.24	0.24		
	32-60	20-35	1.30-1.50	0.06-0.20	0.15-0.18	Moderate	0.0-0.5	0.37	0.37		
560F:											
Elve-----	0-18	10-20	1.20-1.40	2.00-6.00	0.08-0.10	Low	0.5-2.0	0.10	0.32	5	5
	18-60	10-20	1.40-1.60	2.00-6.00	0.02-0.03	Low	0.0-0.5	0.05	0.24		
Rock outcrop----											
561B:											
Scobey-----	0-6	27-35	1.15-1.35	0.60-2.00	0.16-0.18	Moderate	1.0-3.0	0.37	0.37	5	6
	6-15	35-45	1.30-1.50	0.20-0.60	0.15-0.18	High	0.5-1.0	0.32	0.32		
	15-60	30-40	1.35-1.65	0.06-0.20	0.15-0.18	Moderate	0.0-0.5	0.37	0.37		
Kevin-----	0-6	27-32	1.20-1.40	0.60-2.00	0.14-0.18	Moderate	1.0-3.0	0.37	0.37	5	6
	6-9	35-45	1.30-1.50	0.20-0.60	0.15-0.19	High	1.0-3.0	0.37	0.37		
	9-31	27-35	1.30-1.60	0.20-0.60	0.15-0.19	Moderate	0.5-1.0	0.37	0.37		
	31-60	27-35	1.60-1.80	0.06-0.20	0.12-0.15	Moderate	0.0-0.5	0.37	0.37		
561C:											
Scobey-----	0-6	27-35	1.15-1.35	0.60-2.00	0.16-0.18	Moderate	1.0-3.0	0.37	0.37	5	6
	6-15	35-45	1.30-1.50	0.20-0.60	0.15-0.18	High	0.5-1.0	0.32	0.32		
	15-60	30-40	1.35-1.65	0.06-0.20	0.15-0.18	Moderate	0.0-0.5	0.37	0.37		
Kevin-----	0-6	27-32	1.20-1.40	0.60-2.00	0.14-0.18	Moderate	1.0-3.0	0.37	0.37	5	6
	6-9	35-45	1.30-1.50	0.20-0.60	0.15-0.19	High	1.0-3.0	0.37	0.37		
	9-31	27-35	1.30-1.60	0.20-0.60	0.15-0.19	Moderate	0.5-1.0	0.37	0.37		
	31-60	27-35	1.60-1.80	0.06-0.20	0.12-0.15	Moderate	0.0-0.5	0.37	0.37		
562B:											
Scobey-----	0-6	27-35	1.15-1.35	0.60-2.00	0.16-0.18	Moderate	1.0-3.0	0.37	0.37	5	6
	6-15	35-45	1.30-1.50	0.20-0.60	0.15-0.18	High	0.5-1.0	0.32	0.32		
	15-60	30-40	1.35-1.65	0.06-0.20	0.15-0.18	Moderate	0.0-0.5	0.37	0.37		
Linnet-----	0-7	40-45	1.15-1.35	0.06-0.20	0.14-0.18	High	1.0-3.0	0.32	0.32	5	4
	7-14	45-60	1.30-1.50	0.06-0.20	0.13-0.16	High	0.5-1.0	0.32	0.32		
	14-36	35-50	1.30-1.50	0.06-0.20	0.13-0.16	High	0.5-1.0	0.32	0.32		
	36-60	35-50	1.30-1.55	0.06-0.20	0.12-0.15	High	0.0-0.5	0.32	0.32		
563A:											
Fortbenton-----	0-7	10-18	1.40-1.60	2.00-6.00	0.13-0.16	Low	1.0-2.0	0.32	0.32	5	3
	7-24	10-18	1.45-1.65	2.00-6.00	0.12-0.15	Low	0.5-1.0	0.32	0.32		
	24-60	27-35	1.30-1.50	0.06-0.20	0.16-0.20	Moderate	0.0-0.5	0.37	0.37		
Scobey-----	0-7	10-20	1.20-1.40	0.60-2.00	0.13-0.15	Low	1.0-3.0	0.32	0.32	5	3
	7-15	35-45	1.30-1.50	0.20-0.60	0.15-0.18	High	0.5-1.0	0.32	0.32		
	15-60	30-40	1.35-1.65	0.06-0.20	0.15-0.18	Moderate	0.0-0.5	0.37	0.37		
580F:											
Garlet-----	0-12	10-25	1.20-1.40	0.60-2.00	0.12-0.15	Low	1.0-4.0	0.20	0.37	3	5
	12-26	10-25	1.45-1.70	0.60-2.00	0.08-0.09	Low	0.5-1.0	0.10	0.37		
	26-44	10-25	1.45-1.70	0.60-2.00	0.07-0.08	Low	0.0-0.5	0.10	0.24		
	44-60	10-25	1.45-1.70	0.60-2.00	0.06-0.07	Low	0.0-0.5	0.10	0.24		
Elkner-----	0-5	5-10	1.20-1.40	2.00-6.00	0.13-0.15	Low	3.0-5.0	0.20	0.20	5	3
	5-32	5-10	1.35-1.60	2.00-6.00	0.10-0.12	Low	1.0-2.0	0.10	0.15		
	32-60	0-5	1.40-1.65	2.00-6.00	0.07-0.08	Low	0.5-1.0	0.05	0.05		

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
601A:											
Havre-----	0-6	20-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	0.5-2.0	0.37	0.37	5	6
	6-60	18-35	1.35-1.55	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.28	0.28		
Glendive-----	0-6	5-15	1.30-1.50	2.00-6.00	0.13-0.16	Low	0.5-2.0	0.20	0.20	5	3
	6-29	5-18	1.30-1.50	2.00-6.00	0.15-0.18	Low	0.5-1.0	0.32	0.32		
	29-60	5-18	1.35-1.60	2.00-6.00	0.10-0.14	Low	0.5-1.0	0.20	0.20		
602A:											
Havre-----	0-10	27-35	1.25-1.45	0.20-0.60	0.14-0.18	Moderate	0.5-2.0	0.32	0.32	5	7
	10-60	18-35	1.35-1.55	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.28	0.28		
603A:											
Havre-----	0-6	20-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	0.5-2.0	0.37	0.37	5	6
	6-60	18-35	1.35-1.55	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.28	0.28		
Glendive-----	0-6	5-15	1.40-1.60	2.00-6.00	0.10-0.13	Low	0.5-2.0	0.20	0.20	5	3
	6-29	5-18	1.35-1.65	2.00-6.00	0.15-0.19	Low	0.5-1.0	0.32	0.32		
	29-60	5-18	1.35-1.65	2.00-6.00	0.10-0.13	Low	0.5-1.0	0.20	0.20		
605C:											
Yamacall-----	0-4	18-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-2.0	0.37	0.37	5	6
	4-12	18-35	1.25-1.45	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	12-60	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.37	0.37		
Havre-----	0-6	20-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	0.5-2.0	0.37	0.37	5	6
	6-60	18-35	1.35-1.55	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.28	0.28		
621E:											
Sagedale-----	0-4	35-40	1.20-1.40	0.06-0.20	0.16-0.20	Moderate	1.0-2.0	0.37	0.37	5	4
	4-15	32-45	1.30-1.50	0.06-0.20	0.15-0.18	Moderate	1.0-2.0	0.32	0.37		
	15-30	35-45	1.30-1.50	0.06-0.20	0.15-0.17	Moderate	0.5-1.0	0.32	0.37		
	30-60	35-45	1.30-1.55	0.06-0.20	0.14-0.16	Moderate	0.0-0.5	0.32	0.37		
Wayden-----	0-3	35-40	1.10-1.50	0.06-0.20	0.14-0.18	High	0.5-2.0	0.37	0.37	2	4
	3-18	35-50	1.10-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37		
	18-60	---	---	---	---	---	---	---	---		
621F:											
Wayden-----	0-3	35-40	1.10-1.50	0.06-0.20	0.14-0.18	High	0.5-2.0	0.37	0.37	2	4
	3-18	35-50	1.10-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37		
	18-60	---	---	---	---	---	---	---	---		
Sagedale-----	0-4	30-40	1.20-1.40	0.06-0.20	0.16-0.20	Moderate	1.0-2.0	0.37	0.37	5	4
	4-15	32-45	1.30-1.50	0.06-0.20	0.15-0.18	Moderate	1.0-2.0	0.32	0.37		
	15-30	35-45	1.30-1.50	0.06-0.20	0.15-0.17	Moderate	0.5-1.0	0.32	0.37		
	30-60	35-45	1.30-1.55	0.06-0.20	0.14-0.16	Moderate	0.0-0.5	0.32	0.37		
623F:											
Linwell-----	0-11	30-40	1.10-1.20	0.20-0.60	0.16-0.20	Moderate	2.0-6.0	0.32	0.32	5	6
	11-24	35-45	1.30-1.50	0.06-0.20	0.14-0.18	High	0.5-2.0	0.37	0.37		
	24-60	35-45	1.30-1.50	0.06-0.20	0.13-0.16	High	0.0-0.5	0.37	0.37		
Winifred-----	0-4	27-40	1.20-1.40	0.20-0.60	0.14-0.18	Moderate	1.0-3.0	0.32	0.32	3	6
	4-15	35-50	1.25-1.45	0.06-0.20	0.13-0.17	High	0.5-1.0	0.32	0.32		
	15-34	35-50	1.30-1.50	0.06-0.20	0.13-0.17	High	0.0-0.5	0.32	0.32		
	34-60	---	---	---	---	---	---	---	---		

Physical Properties of the Soils--Continued

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
654F: (cont.)											
Twilight-----	0-5	5-18	1.15-1.40	2.00-6.00	0.13-0.16	Low	1.0-3.0	0.20	0.20	3	3
	5-15	5-18	1.25-1.50	2.00-6.00	0.13-0.16	Low	0.5-1.0	0.20	0.20		
	15-30	5-18	1.25-1.50	2.00-6.00	0.12-0.15	Low	0.0-0.5	0.20	0.20		
	30-60	---	---	---	---	---	---	---	---		
Rock outcrop----											
661E:											
Twilight-----	0-5	5-18	1.15-1.40	2.00-6.00	0.13-0.16	Low	1.0-3.0	0.20	0.20	3	3
	5-15	5-18	1.25-1.50	2.00-6.00	0.13-0.16	Low	0.5-1.0	0.20	0.20		
	15-30	5-18	1.25-1.50	2.00-6.00	0.12-0.15	Low	0.0-0.5	0.20	0.20		
	30-60	---	---	---	---	---	---	---	---		
Fleak-----	0-3	0-10	1.20-1.50	6.00-20.00	0.08-0.10	Low	0.5-1.0	0.20	0.20	2	2
	3-18	0-10	1.20-1.50	6.00-20.00	0.06-0.07	Low	0.0-0.5	0.17	0.17		
	18-60	---	---	---	---	---	---	---	---		
671B:											
Bearpaw-----	0-6	27-35	1.15-1.35	0.20-0.60	0.15-0.18	Moderate	1.0-3.0	0.37	0.37	5	6
	6-16	35-50	1.30-1.50	0.20-0.60	0.15-0.18	High	0.5-1.0	0.37	0.37		
	16-34	35-45	1.30-1.55	0.20-0.60	0.15-0.18	High	0.0-0.5	0.37	0.37		
	34-60	30-45	1.35-1.65	0.06-0.20	0.12-0.15	High	0.0-0.5	0.37	0.37		
Vida-----	0-5	27-30	1.20-1.40	0.60-2.00	0.14-0.18	Moderate	1.0-3.0	0.37	0.37	5	6
	5-15	25-35	1.30-1.50	0.20-0.60	0.14-0.18	Moderate	1.0-2.0	0.37	0.37		
	15-60	25-35	1.50-1.75	0.06-0.20	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
671C:											
Bearpaw-----	0-6	27-35	1.15-1.35	0.20-0.60	0.15-0.18	Moderate	1.0-3.0	0.37	0.37	5	6
	6-16	35-50	1.30-1.50	0.20-0.60	0.15-0.18	High	0.5-1.0	0.37	0.37		
	16-34	35-45	1.30-1.55	0.20-0.60	0.15-0.18	High	0.0-0.5	0.37	0.37		
	34-60	30-45	1.35-1.65	0.06-0.20	0.12-0.15	High	0.0-0.5	0.37	0.37		
Vida-----	0-5	27-30	1.20-1.40	0.60-2.00	0.14-0.18	Moderate	1.0-3.0	0.37	0.37	5	6
	5-15	25-35	1.30-1.50	0.20-0.60	0.14-0.18	Moderate	1.0-2.0	0.37	0.37		
	15-60	25-35	1.50-1.75	0.06-0.20	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
673A:											
Bearpaw-----	0-6	27-35	1.15-1.35	0.20-0.60	0.15-0.18	Moderate	1.0-3.0	0.37	0.37	5	6
	6-16	35-50	1.30-1.50	0.20-0.60	0.15-0.18	High	0.5-1.0	0.37	0.37		
	16-34	35-45	1.30-1.55	0.20-0.60	0.15-0.18	High	0.0-0.5	0.37	0.37		
	34-60	30-45	1.35-1.65	0.06-0.20	0.12-0.15	High	0.0-0.5	0.37	0.37		
Daglum-----	0-12	20-27	1.10-1.30	0.60-2.00	0.15-0.19	Low	2.0-4.0	0.43	0.43	2	6
	12-20	35-60	1.30-1.50	0.06-0.20	0.12-0.15	High	0.5-1.0	0.28	0.28		
	20-60	35-60	1.50-1.70	0.06-0.20	0.09-0.12	High	0.0-0.5	0.28	0.28		
674B:											
Bearpaw-----	0-6	27-35	1.15-1.35	0.20-0.60	0.15-0.18	Moderate	1.0-3.0	0.37	0.37	5	6
	6-16	35-50	1.30-1.50	0.20-0.60	0.15-0.18	High	0.5-1.0	0.37	0.37		
	16-34	35-45	1.30-1.55	0.20-0.60	0.15-0.18	High	0.0-0.5	0.37	0.37		
	34-60	30-45	1.35-1.65	0.06-0.20	0.12-0.15	High	0.0-0.5	0.37	0.37		
Waltham-----	0-6	35-40	1.25-1.40	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.43	0.43	2	4
	6-11	45-60	1.40-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.43	0.43		
	11-18	35-45	1.40-1.50	0.00-0.06	0.12-0.16	Moderate	0.0-0.5	0.43	0.43		
	18-60	27-40	1.60-1.80	0.00-0.06	0.10-0.14	Moderate	0.0-0.5	0.43	0.43		

Physical Properties of the Soils--Continued

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
680F:											
Winkler-----	0-10	5-15	1.20-1.40	2.00-6.00	0.09-0.12	Low	2.0-4.0	0.10	0.28	3	3
	10-18	5-15	1.40-1.60	2.00-6.00	0.05-0.06	Low	0.5-1.0	0.05	0.20		
	18-36	5-15	1.40-1.60	2.00-6.00	0.04-0.05	Low	0.0-0.5	0.05	0.20		
	36-60	5-15	1.40-1.65	2.00-6.00	0.03-0.04	Low	0.0-0.5	0.02	0.17		
Ambrant-----	0-4	5-15	1.20-1.40	2.00-6.00	0.10-0.13	Low	3.0-5.0	0.20	0.20	4	3
	4-21	5-15	1.35-1.55	2.00-6.00	0.08-0.10	Low	0.5-1.0	0.15	0.24		
	21-43	5-18	1.35-1.55	2.00-6.00	0.08-0.10	Low	0.0-0.5	0.15	0.24		
	43-60	0-5	1.30-1.50	6.00-20.00	0.03-0.05	Low	0.0-0.5	0.10	0.24		
Winkler-----	0-10	5-15	1.20-1.40	2.00-6.00	0.09-0.12	Low	2.0-4.0	0.10	0.28	3	3
	10-18	5-15	1.40-1.60	2.00-6.00	0.05-0.06	Low	0.5-1.0	0.05	0.20		
	18-36	5-15	1.40-1.60	2.00-6.00	0.04-0.05	Low	0.0-0.5	0.05	0.20		
	36-60	5-15	1.40-1.65	2.00-6.00	0.03-0.04	Low	0.0-0.5	0.02	0.17		
681C:											
Gerber-----	0-6	40-50	1.15-1.35	0.06-0.20	0.14-0.18	High	1.0-3.0	0.32	0.32	5	4
	6-14	45-60	1.20-1.40	0.06-0.20	0.14-0.18	High	1.0-2.0	0.32	0.32		
	14-30	35-50	1.25-1.45	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37		
	30-60	35-50	1.35-1.60	0.06-0.20	0.14-0.18	High	0.0-0.5	0.37	0.37		
691D:											
Vida-----	0-5	20-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.43	0.43	5	6
	5-34	25-35	1.30-1.50	0.20-0.60	0.14-0.18	Moderate	1.0-2.0	0.37	0.37		
	34-60	25-35	1.50-1.75	0.06-0.20	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
Williams-----	0-5	15-27	1.15-1.35	0.60-2.00	0.19-0.21	Low	2.0-5.0	0.43	0.49	5	6
	5-16	25-35	1.25-1.45	0.60-2.00	0.17-0.19	Moderate	1.0-2.0	0.37	0.43		
	16-60	22-35	1.50-1.75	0.06-0.60	0.16-0.18	Moderate	0.5-1.0	0.37	0.43		
692D:											
Vida-----	0-5	27-30	1.20-1.40	0.60-2.00	0.14-0.18	Moderate	1.0-3.0	0.37	0.37	5	6
	5-15	27-35	1.30-1.50	0.20-0.60	0.14-0.18	Moderate	1.0-2.0	0.37	0.37		
	15-60	27-35	1.50-1.75	0.06-0.20	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
Bearpaw-----	0-6	27-35	1.15-1.35	0.20-0.60	0.15-0.18	Moderate	1.0-3.0	0.37	0.37	5	6
	6-16	35-50	1.30-1.50	0.20-0.60	0.15-0.18	High	0.5-1.0	0.37	0.37		
	16-34	35-45	1.30-1.55	0.20-0.60	0.15-0.18	High	0.0-0.5	0.37	0.37		
	34-60	30-45	1.35-1.65	0.06-0.20	0.12-0.15	High	0.0-0.5	0.37	0.37		
693C:											
Vida-----	0-5	27-30	1.20-1.40	0.60-2.00	0.14-0.18	Moderate	1.0-3.0	0.37	0.37	5	6
	5-15	27-35	1.30-1.50	0.20-0.60	0.14-0.18	Moderate	1.0-2.0	0.37	0.37		
	15-60	27-35	1.50-1.75	0.06-0.20	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
Bearpaw-----	0-6	27-35	1.15-1.35	0.20-0.60	0.15-0.18	Moderate	1.0-3.0	0.37	0.37	5	6
	6-16	35-50	1.30-1.50	0.20-0.60	0.15-0.18	High	0.5-1.0	0.37	0.37		
	16-34	35-45	1.30-1.55	0.20-0.60	0.15-0.18	High	0.0-0.5	0.37	0.37		
	34-60	30-45	1.35-1.65	0.06-0.20	0.12-0.15	High	0.0-0.5	0.37	0.37		
Nishon-----	0-8	27-35	1.25-1.45	0.60-2.00	0.14-0.17	Moderate	0.5-1.0	0.37	0.37	5	6
	8-31	40-60	1.30-1.50	0.06-0.20	0.14-0.17	High	0.5-1.0	0.32	0.32		
	31-60	35-55	1.30-1.50	0.06-0.20	0.14-0.17	High	0.0-0.5	0.32	0.32		
701E:											
Work-----	0-6	27-35	1.15-1.35	0.60-2.00	0.15-0.18	Moderate	2.0-4.0	0.28	0.28	5	6
	6-22	35-50	1.25-1.50	0.20-0.60	0.14-0.17	High	1.0-2.0	0.28	0.28		
	22-48	20-40	1.30-1.50	0.20-0.60	0.14-0.17	Moderate	0.5-1.0	0.32	0.32		
	48-60	15-40	1.30-1.55	0.20-0.60	0.11-0.15	Moderate	0.0-0.5	0.17	0.24		

Physical Properties of the Soils--Continued

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
701E: (cont.)											
Absarokee-----	0-7	27-35	1.15-1.35	0.60-2.00	0.15-0.19	Moderate	3.0-6.0	0.28	0.28	2	6
	7-18	35-50	1.20-1.40	0.20-0.60	0.13-0.16	High	1.0-2.0	0.28	0.28		
	18-34	30-40	1.30-1.50	0.20-0.60	0.12-0.15	Moderate	0.5-1.0	0.37	0.37		
	34-60	---	---	---	---	---	---	---	---		
702E:											
Work-----	0-6	20-27	1.20-1.40	0.60-2.00	0.12-0.14	Low	2.0-4.0	0.20	0.37	5	6
	6-22	35-50	1.25-1.50	0.20-0.60	0.14-0.17	High	1.0-2.0	0.28	0.28		
	22-48	20-40	1.30-1.50	0.20-0.60	0.15-0.18	Moderate	0.5-1.0	0.32	0.32		
	48-60	15-40	1.30-1.55	0.20-0.60	0.11-0.13	Moderate	0.0-0.5	0.17	0.28		
Absarokee-----	0-7	20-27	1.10-1.30	0.60-2.00	0.12-0.18	Low	3.0-6.0	0.20	0.37	2	6
	7-18	35-50	1.20-1.40	0.20-0.60	0.13-0.16	High	1.0-2.0	0.28	0.28		
	18-34	30-40	1.30-1.50	0.20-0.60	0.12-0.15	Moderate	0.5-1.0	0.37	0.37		
	34-60	---	---	---	---	---	---	---	---		
721E:											
Zahill-----	0-3	27-35	1.20-1.40	0.60-2.00	0.14-0.18	Moderate	0.5-2.0	0.37	0.37	5	4L
	3-18	20-35	1.30-1.60	0.20-0.60	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	18-60	20-35	1.60-1.80	0.06-0.20	0.14-0.18	Moderate	0.0-0.5	0.37	0.37		
Vida-----	0-5	27-30	1.20-1.40	0.60-2.00	0.14-0.18	Moderate	1.0-3.0	0.37	0.37	5	6
	5-15	25-35	1.30-1.50	0.20-0.60	0.14-0.18	Moderate	1.0-2.0	0.37	0.37		
	15-60	25-35	1.50-1.75	0.06-0.20	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
722F:											
Zahill-----	0-3	27-35	1.20-1.40	0.60-2.00	0.14-0.18	Moderate	0.5-2.0	0.37	0.37	5	4L
	3-18	20-35	1.30-1.60	0.20-0.60	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	18-60	20-35	1.60-1.80	0.06-0.20	0.14-0.18	Moderate	0.0-0.5	0.37	0.37		
Sagedale-----	0-4	35-40	1.20-1.40	0.06-0.20	0.16-0.20	Moderate	1.0-2.0	0.37	0.37	5	4
	4-15	32-45	1.30-1.50	0.06-0.20	0.15-0.18	Moderate	1.0-2.0	0.32	0.37		
	15-30	35-45	1.30-1.50	0.06-0.20	0.15-0.17	Moderate	0.5-1.0	0.32	0.37		
	30-60	35-45	1.30-1.55	0.06-0.20	0.14-0.16	Moderate	0.0-0.5	0.32	0.37		
Wayden-----	0-3	35-40	1.10-1.50	0.06-0.20	0.14-0.18	High	0.5-2.0	0.37	0.37	2	4
	3-18	35-50	1.10-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37		
	18-60	---	---	---	---	---	---	---	---		
723F:											
Zahill-----	0-3	27-35	1.20-1.40	0.60-2.00	0.14-0.18	Moderate	0.5-2.0	0.37	0.37	5	4L
	3-18	20-35	1.30-1.60	0.20-0.60	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	18-60	20-35	1.60-1.80	0.06-0.20	0.14-0.18	Moderate	0.0-0.5	0.37	0.37		
Cabba-----	0-3	20-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	2	4L
	3-15	20-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	15-60	---	---	---	---	---	---	---	---		
731F:											
Yetull-----	0-5	0-10	1.35-1.55	6.00-20.00	0.05-0.08	Low	1.0-2.0	0.20	0.20	5	1
	5-60	0-10	1.45-1.65	6.00-20.00	0.05-0.07	Low	0.0-1.0	0.20	0.20		
Dune land-----											
741B:											
Shambo-----	0-6	18-27	1.10-1.30	0.60-2.00	0.18-0.22	Low	2.0-6.0	0.32	0.32	5	6
	6-15	18-35	1.20-1.50	0.60-2.00	0.17-0.19	Moderate	1.0-2.0	0.37	0.37		
	15-60	18-35	1.20-1.50	0.60-2.00	0.17-0.19	Moderate	0.5-1.0	0.37	0.37		

Physical Properties of the Soils--Continued

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
741B: (cont.)											
Straw-----	0-8	10-27	1.05-1.25	0.60-2.00	0.16-0.22	Low	2.0-4.0	0.32	0.32	5	5
	8-42	18-32	1.20-1.40	0.60-2.00	0.14-0.18	Low	1.0-3.0	0.32	0.32		
	42-60	5-20	1.40-1.60	2.00-6.00	0.10-0.14	Low	0.0-0.5	0.24	0.24		
745F:											
Shambo-----	0-6	20-27	1.10-1.30	0.60-2.00	0.18-0.22	Low	2.0-6.0	0.32	0.32	5	6
	6-15	18-35	1.20-1.50	0.60-2.00	0.17-0.19	Moderate	1.0-2.0	0.37	0.37		
	15-60	18-35	1.20-1.50	0.60-2.00	0.17-0.19	Moderate	0.5-1.0	0.37	0.37		
Amor-----	0-5	15-27	1.15-1.35	0.60-2.00	0.18-0.20	Moderate	2.0-4.0	0.32	0.32	3	6
	5-34	18-35	1.35-1.55	0.60-2.00	0.15-0.18	Moderate	0.5-1.0	0.32	0.32		
	34-60	---	---	---	---	---	---	---	---		
Cabba-----	0-3	20-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	2	4L
	3-15	20-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	15-60	---	---	---	---	---	---	---	---		
761C:											
Hedoes-----	0-5	10-15	1.05-1.25	0.60-2.00	0.16-0.20	Low	5.0-10	0.28	0.28	5	5
	5-20	10-18	1.30-1.50	0.60-2.00	0.14-0.17	Low	4.0-8.0	0.28	0.28		
	20-31	5-18	1.40-1.60	2.00-6.00	0.09-0.11	Low	0.5-1.0	0.15	0.24		
	31-60	0-10	1.40-1.60	2.00-6.00	0.06-0.07	Low	0.0-0.5	0.10	0.24		
Belain-----	0-6	15-20	1.10-1.30	0.60-2.00	0.16-0.20	Low	2.0-4.0	0.32	0.32	2	5
	6-18	10-18	1.35-1.55	0.60-2.00	0.12-0.15	Low	1.0-2.0	0.24	0.32		
	18-26	10-18	1.35-1.55	2.00-6.00	0.11-0.13	Low	0.5-1.0	0.20	0.37		
	26-60	---	---	---	---	---	---	---	---		
761E:											
Hedoes-----	0-5	10-15	1.05-1.25	0.60-2.00	0.16-0.20	Low	5.0-10	0.28	0.28	5	5
	5-20	5-15	1.30-1.50	0.60-2.00	0.14-0.17	Low	4.0-8.0	0.28	0.28		
	20-31	0-10	1.40-1.60	2.00-6.00	0.09-0.11	Low	0.5-1.0	0.15	0.24		
	31-60	0-10	1.40-1.60	2.00-6.00	0.06-0.07	Low	0.0-0.5	0.10	0.24		
Belain-----	0-6	15-20	1.10-1.30	0.60-2.00	0.16-0.20	Low	2.0-4.0	0.32	0.32	2	5
	6-18	10-18	1.35-1.55	0.60-2.00	0.12-0.15	Low	1.0-2.0	0.24	0.32		
	18-26	10-18	1.35-1.55	2.00-6.00	0.11-0.13	Low	0.5-1.0	0.20	0.37		
	26-60	---	---	---	---	---	---	---	---		
793B:											
Yamacall-----	0-5	27-35	1.25-1.45	0.60-2.00	0.14-0.18	Moderate	1.0-3.0	0.32	0.32	5	4L
	5-38	18-35	1.30-1.50	0.60-2.00	0.16-0.20	Moderate	0.5-1.0	0.37	0.37		
	38-60	15-35	1.25-1.45	0.60-2.00	0.14-0.18	Low	0.0-0.5	0.32	0.32		
793C:											
Yamacall-----	0-5	27-35	1.25-1.45	0.60-2.00	0.14-0.18	Moderate	1.0-3.0	0.32	0.32	5	4L
	5-38	18-35	1.30-1.50	0.60-2.00	0.16-0.20	Moderate	0.5-1.0	0.37	0.37		
	38-60	15-35	1.25-1.45	0.60-2.00	0.14-0.18	Low	0.0-0.5	0.32	0.32		
795C:											
Yamacall-----	0-5	27-35	1.25-1.45	0.60-2.00	0.14-0.18	Moderate	1.0-3.0	0.32	0.32	5	4L
	5-38	18-35	1.30-1.50	0.60-2.00	0.16-0.20	Moderate	0.5-1.0	0.37	0.37		
	38-60	15-35	1.25-1.45	0.60-2.00	0.14-0.18	Low	0.0-0.5	0.32	0.32		
Benz-----	0-7	27-35	1.25-1.45	0.20-0.60	0.13-0.17	Moderate	0.5-2.0	0.43	0.43	5	4L
	7-60	18-35	1.35-1.55	0.06-0.20	0.08-0.13	Moderate	0.0-0.5	0.37	0.37		

Physical Properties of the Soils--Continued

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
795D:											
Yamacall-----	0-5	27-35	1.25-1.45	0.60-2.00	0.14-0.18	Moderate	1.0-3.0	0.32	0.32	5	4L
	5-38	18-35	1.30-1.50	0.60-2.00	0.16-0.20	Moderate	0.5-1.0	0.37	0.37		
	38-60	15-35	1.25-1.45	0.60-2.00	0.14-0.18	Low	0.0-0.5	0.32	0.32		
Benz-----	0-7	27-35	1.25-1.45	0.20-0.60	0.13-0.17	Moderate	0.5-2.0	0.43	0.43	5	4L
	7-60	18-35	1.35-1.55	0.06-0.20	0.08-0.13	Moderate	0.0-0.5	0.37	0.37		
801B:											
Williams-----	0-5	15-27	1.15-1.35	0.60-2.00	0.19-0.21	Low	2.0-5.0	0.43	0.49	5	6
	5-16	25-35	1.25-1.45	0.60-2.00	0.17-0.19	Moderate	1.0-2.0	0.37	0.43		
	16-60	22-35	1.50-1.75	0.06-0.60	0.16-0.18	Moderate	0.5-1.0	0.37	0.43		
Vida-----	0-5	20-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.43	0.43	5	6
	5-34	25-35	1.30-1.50	0.20-0.60	0.14-0.18	Moderate	1.0-2.0	0.37	0.37		
	34-60	25-35	1.50-1.75	0.06-0.20	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
801C:											
Williams-----	0-5	15-27	1.15-1.35	0.60-2.00	0.19-0.21	Low	2.0-5.0	0.43	0.49	5	6
	5-16	25-35	1.25-1.45	0.60-2.00	0.17-0.19	Moderate	1.0-2.0	0.37	0.43		
	16-60	22-35	1.50-1.75	0.06-0.60	0.16-0.18	Moderate	0.5-1.0	0.37	0.43		
Vida-----	0-5	20-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.43	0.43	5	6
	5-34	25-35	1.30-1.50	0.20-0.60	0.14-0.18	Moderate	1.0-2.0	0.37	0.37		
	34-60	25-35	1.50-1.75	0.06-0.20	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
828A:											
Savage-----	0-6	20-27	1.15-1.35	0.60-2.00	0.18-0.22	Low	2.0-4.0	0.43	0.43	5	6
	6-28	35-50	1.30-1.50	0.06-0.20	0.14-0.18	High	1.0-3.0	0.32	0.32		
	28-60	30-45	1.35-1.55	0.06-0.20	0.13-0.16	High	0.5-1.0	0.32	0.32		
842A:											
Savage-----	0-6	27-35	1.10-1.25	0.60-2.00	0.16-0.20	Moderate	2.0-4.0	0.37	0.37	5	7
	6-22	35-50	1.25-1.40	0.06-0.20	0.14-0.18	High	1.0-2.0	0.32	0.32		
	22-36	30-45	1.30-1.45	0.06-0.20	0.13-0.17	High	0.5-1.0	0.32	0.32		
	36-60	30-45	1.35-1.50	0.06-0.20	0.10-0.14	High	0.0-0.5	0.32	0.32		
Daglum-----	0-9	18-27	1.15-1.35	0.60-2.00	0.15-0.19	Low	2.0-4.0	0.43	0.43	2	6
	9-16	35-60	1.30-1.45	0.06-0.20	0.13-0.17	High	0.5-1.0	0.32	0.32		
	16-60	35-60	1.35-1.50	0.06-0.20	0.10-0.14	High	0.0-0.5	0.32	0.32		
863E:											
Work-----	0-6	20-27	1.20-1.40	0.60-2.00	0.12-0.14	Low	2.0-4.0	0.20	0.37	5	6
	6-22	35-50	1.25-1.50	0.20-0.60	0.14-0.17	High	1.0-2.0	0.28	0.28		
	22-48	20-40	1.30-1.50	0.20-0.60	0.15-0.18	Moderate	0.5-1.0	0.32	0.32		
	48-60	15-40	1.30-1.55	0.20-0.60	0.11-0.13	Moderate	0.0-0.5	0.17	0.28		
Roy-----	0-7	15-27	1.10-1.30	0.60-2.00	0.12-0.15	Low	2.0-4.0	0.20	0.32	5	6
	7-15	35-50	1.30-1.50	0.20-0.60	0.07-0.08	Moderate	0.5-1.0	0.05	0.28		
	15-60	27-40	1.45-1.65	0.20-0.60	0.06-0.07	Low	0.0-0.5	0.05	0.28		
871B:											
Tamaneen-----	0-6	27-35	1.15-1.35	0.60-2.00	0.12-0.14	Moderate	2.0-5.0	0.17	0.37	3	6
	6-15	35-50	1.20-1.40	0.20-0.60	0.14-0.16	High	1.0-2.0	0.32	0.32		
	15-19	30-45	1.30-1.50	0.20-0.60	0.14-0.16	Moderate	0.5-1.0	0.32	0.32		
	19-30	18-35	1.40-1.60	0.60-2.00	0.10-0.12	Low	0.0-0.5	0.10	0.28		
	30-60	8-25	1.45-1.65	2.00-6.00	0.04-0.05	Low	0.0-0.5	0.05	0.32		

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
911F:											
Belain-----	0-6	15-20	1.10-1.30	0.60-2.00	0.16-0.20	Low	2.0-4.0	0.32	0.32	2	5
	6-18	10-18	1.35-1.55	0.60-2.00	0.12-0.15	Low	1.0-2.0	0.24	0.32		
	18-26	10-18	1.35-1.55	2.00-6.00	0.11-0.13	Low	0.5-1.0	0.20	0.37		
	26-60	---	---	---	---	---	---	---	---		
Whitlash-----	0-6	10-27	1.10-1.30	0.60-2.00	0.10-0.16	Low	2.0-4.0	0.20	0.37	1	5
	6-15	10-27	1.10-1.35	0.60-2.00	0.05-0.10	Low	2.0-4.0	0.10	0.37		
	15-60	---	---	---	---	---	---	---	---		
Hedoes-----	0-5	10-15	1.05-1.25	0.60-2.00	0.16-0.20	Low	5.0-10	0.28	0.28	5	5
	5-20	10-18	1.30-1.50	0.60-2.00	0.14-0.17	Low	4.0-8.0	0.28	0.28		
	20-31	5-18	1.40-1.60	2.00-6.00	0.09-0.11	Low	0.5-1.0	0.15	0.24		
	31-60	0-10	1.40-1.60	2.00-6.00	0.06-0.07	Low	0.0-0.5	0.10	0.24		
916C:											
Belain-----	0-5	5-15	1.25-1.45	2.00-6.00	0.10-0.14	Low	2.0-4.0	0.20	0.20	2	3
	5-20	10-18	1.35-1.55	0.60-2.00	0.12-0.15	Low	1.0-2.0	0.24	0.32		
	20-24	10-18	1.35-1.55	2.00-6.00	0.07-0.08	Low	0.0-0.5	0.17	0.43		
	24-60	---	---	---	---	---	---	---	---		
Hedoes-----	0-8	5-15	1.15-1.35	0.60-2.00	0.13-0.16	Low	5.0-10	0.17	0.17	5	3
	8-18	5-18	1.30-1.50	0.60-2.00	0.14-0.17	Low	4.0-8.0	0.28	0.28		
	18-60	0-10	1.40-1.60	2.00-6.00	0.09-0.11	Low	0.5-1.0	0.15	0.24		
925F:											
Sunburst-----	0-5	35-40	1.20-1.40	0.06-0.20	0.14-0.18	Moderate	1.0-3.0	0.37	0.37	5	4
	5-20	35-50	1.25-1.45	0.06-0.20	0.12-0.15	High	0.5-1.0	0.37	0.37		
	20-60	35-50	1.35-1.60	0.06-0.20	0.12-0.15	High	0.0-0.5	0.37	0.37		
Lambeth-----	0-4	20-27	1.20-1.40	0.20-0.60	0.18-0.22	Low	1.0-2.0	0.43	0.43	5	4L
	4-60	20-35	1.25-1.50	0.20-0.60	0.17-0.21	Moderate	0.0-1.0	0.37	0.37		
941D:											
Busby-----	0-4	10-18	1.30-1.50	2.00-6.00	0.12-0.16	Low	1.0-2.0	0.20	0.20	5	3
	4-11	10-18	1.40-1.60	2.00-6.00	0.12-0.16	Low	0.5-1.0	0.32	0.32		
	11-28	10-18	1.40-1.60	2.00-6.00	0.12-0.15	Low	0.0-0.5	0.20	0.20		
	28-60	3-18	1.50-1.70	2.00-6.00	0.08-0.10	Low	0.0-0.5	0.20	0.20		
Twilight-----	0-5	5-18	1.15-1.40	2.00-6.00	0.13-0.16	Low	1.0-3.0	0.20	0.20	3	3
	5-15	5-18	1.25-1.50	2.00-6.00	0.13-0.16	Low	0.5-1.0	0.20	0.20		
	15-30	5-18	1.25-1.50	2.00-6.00	0.12-0.15	Low	0.0-0.5	0.20	0.20		
	30-60	---	---	---	---	---	---	---	---		
943C:											
Tally-----	0-5	10-20	1.25-1.45	2.00-6.00	0.14-0.16	Low	1.0-3.0	0.20	0.20	5	3
	5-24	5-18	1.35-1.60	2.00-6.00	0.13-0.15	Low	1.0-2.0	0.20	0.20		
	24-60	5-18	1.40-1.65	2.00-6.00	0.11-0.13	Low	0.5-1.0	0.20	0.20		
943E:											
Tally-----	0-5	10-20	1.25-1.45	2.00-6.00	0.14-0.16	Low	1.0-3.0	0.20	0.20	5	3
	5-24	5-18	1.35-1.60	2.00-6.00	0.13-0.15	Low	1.0-2.0	0.20	0.20		
	24-60	5-18	1.40-1.65	2.00-6.00	0.11-0.13	Low	0.5-1.0	0.20	0.20		
Vebar-----	0-7	10-18	1.25-1.45	2.00-6.00	0.12-0.14	Low	1.0-4.0	0.20	0.20	3	3
	7-31	10-18	1.30-1.60	2.00-6.00	0.12-0.14	Low	1.0-2.0	0.20	0.20		
	31-60	---	---	---	---	---	---	---	---		

Physical Properties of the Soils--Continued

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
943F:											
Tally-----	0-5	10-20	1.25-1.45	2.00-6.00	0.14-0.16	Low	1.0-3.0	0.20	0.20	5	3
	5-24	5-18	1.35-1.60	2.00-6.00	0.13-0.15	Low	1.0-2.0	0.20	0.20		
	24-60	5-18	1.40-1.65	2.00-6.00	0.11-0.13	Low	0.5-1.0	0.20	0.20		
Cohagen-----	0-4	10-18	1.35-1.50	2.00-6.00	0.12-0.15	Low	1.0-2.0	0.20	0.20	2	3
	4-15	10-18	1.45-1.60	2.00-6.00	0.09-0.11	Low	0.0-0.5	0.20	0.20		
	15-60	---	---	---	---	---	---	---	---		
965F:											
Cabba-----	0-3	20-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	2	4L
	3-15	20-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37		
	15-60	---	---	---	---	---	---	---	---		
Macar-----	0-6	18-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	5	6
	6-15	18-35	1.25-1.45	0.60-2.00	0.14-0.17	Moderate	1.0-2.0	0.32	0.32		
	15-45	18-35	1.30-1.50	0.60-2.00	0.14-0.17	Moderate	0.5-1.0	0.32	0.32		
	45-60	15-30	1.30-1.60	0.60-2.00	0.13-0.15	Moderate	0.0-0.5	0.32	0.32		
971F:											
Neldore-----	0-4	40-50	1.20-1.40	0.06-0.20	0.14-0.18	High	1.0-3.0	0.32	0.32	2	4
	4-15	40-60	1.30-1.50	0.06-0.20	0.12-0.16	High	0.5-1.0	0.32	0.32		
	15-60	---	---	---	---	---	---	---	---		
Basconvy-----	0-4	40-60	1.20-1.40	0.00-0.06	0.14-0.18	High	1.0-2.0	0.37	0.37	3	4
	4-15	45-60	1.30-1.50	0.00-0.06	0.14-0.18	High	0.5-1.0	0.37	0.37		
	15-29	45-60	1.30-1.50	0.00-0.06	0.13-0.16	High	0.0-0.5	0.37	0.37		
	29-60	---	---	---	---	---	---	---	---		
972F:											
Neldore-----	0-4	40-50	1.20-1.40	0.06-0.20	0.14-0.18	High	1.0-3.0	0.32	0.32	2	4
	4-15	40-60	1.30-1.50	0.06-0.20	0.12-0.16	High	0.5-1.0	0.32	0.32		
	15-60	---	---	---	---	---	---	---	---		
Rock outcrop----											
974F:											
Neldore-----	0-4	40-50	1.20-1.40	0.06-0.20	0.14-0.18	High	1.0-3.0	0.32	0.32	2	4
	4-15	40-60	1.30-1.50	0.06-0.20	0.12-0.16	High	0.5-1.0	0.32	0.32		
	15-60	---	---	---	---	---	---	---	---		
Hillon-----	0-4	20-27	1.20-1.40	0.60-2.00	0.18-0.20	Low	0.5-2.0	0.43	0.43	5	4L
	4-60	20-35	1.50-1.75	0.06-0.20	0.15-0.18	Moderate	0.0-0.5	0.43	0.43		

Chemical Properties of the Soils

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
2:								
Riverwash-----								
2B:								
Marcott-----	0-4	35-40	20.0-30.0	7.4-8.4	---	---	4-8	---
	4-15	35-50	15.0-30.0	7.4-8.4	0-2	---	8-16	---
	15-30	35-50	15.0-30.0	7.4-8.4	3-12	0-2	8-16	---
	30-60	35-50	15.0-30.0	7.4-9.0	5-15	0-2	8-16	---
Bigsandy-----	0-3	15-27	15.0-20.0	7.4-9.0	1-5	---	16-25	0-13
	3-11	18-35	15.0-20.0	7.9-9.0	5-15	---	16-25	0-13
	11-32	18-35	15.0-20.0	8.5-9.0	5-15	1-3	16-25	0-13
	32-60	15-35	15.0-20.0	8.5-9.0	5-15	1-3	16-25	0-13
12C:								
Beaverton-----	0-4	20-27	10.0-15.0	6.6-7.8	---	---	---	---
	4-15	25-35	15.0-20.0	6.6-7.8	---	---	---	---
	15-60	0-10	1.0-5.0	7.4-8.4	3-15	---	0-2	---
Beaverton-----	0-5	20-27	15.0-20.0	6.6-7.8	---	---	---	---
	5-18	25-35	15.0-20.0	6.6-7.8	---	---	---	---
	18-60	0-10	1.0-5.0	7.4-8.4	3-15	---	0-2	---
13C:								
Tanna-----	0-5	27-35	20.0-25.0	6.6-7.8	---	---	---	---
	5-28	35-50	25.0-30.0	6.6-8.4	0-15	---	0-4	---
	28-60	---	---	---	---	---	---	---
15E:								
Lambeth-----	0-4	20-27	15.0-20.0	6.6-8.4	5-10	---	---	---
	4-60	20-35	15.0-20.0	7.9-9.0	10-15	1-5	0-4	1-5
15F:								
Lambeth-----	0-4	20-27	15.0-20.0	6.6-8.4	5-10	---	---	---
	4-60	20-35	15.0-20.0	7.9-9.0	10-15	1-5	0-4	1-5
16B:								
Degrad-----	0-6	10-27	10.0-15.0	6.6-7.8	---	---	---	---
	6-11	20-35	15.0-20.0	6.6-7.8	---	---	---	---
	11-28	15-30	10.0-15.0	7.4-8.4	15-40	---	0-4	---
	28-60	0-5	1.0-5.0	7.4-8.4	8-15	---	0-2	---
17B:								
Delpoint-----	0-4	18-27	15.0-20.0	7.4-8.4	5-10	---	0-4	---
	4-12	18-35	15.0-20.0	7.9-8.4	5-10	---	0-4	---
	12-30	18-35	10.0-15.0	7.9-8.4	5-15	---	0-4	---
	30-60	---	---	---	---	---	---	---
21E:								
Cabbart-----	0-4	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	4-18	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	18-60	---	---	---	---	---	---	---
Delpoint-----	0-4	18-27	15.0-20.0	7.4-8.4	5-10	---	0-4	---
	4-12	18-35	15.0-20.0	7.9-8.4	5-10	---	0-4	---
	12-30	18-35	10.0-15.0	7.9-8.4	5-15	---	0-4	---
	30-60	---	---	---	---	---	---	---

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meg/100g	pH	Pct	Pct	mmhos/cm	
22F:								
Hillon-----	0-4	20-27	20.0-25.0	7.4-8.4	5-10	---	0-2	---
	4-60	20-35	15.0-20.0	7.9-9.0	5-15	---	0-2	---
27B:								
Attewan-----	0-5	10-20	5.0-10.0	6.1-7.8	---	---	---	---
	5-17	20-35	15.0-20.0	6.6-7.8	---	---	---	---
	17-27	15-30	10.0-15.0	7.4-8.4	5-15	---	0-2	---
	27-60	0-10	1.0-5.0	7.4-8.4	5-10	---	0-2	---
28:								
Nishon-----	0-8	27-35	15.0-20.0	6.1-7.8	---	---	---	---
	8-31	40-60	30.0-35.0	6.6-8.4	---	---	0-2	---
	31-60	35-55	30.0-35.0	7.4-8.4	5-15	---	2-4	---
30B:								
Marvan-----	0-3	40-60	25.0-30.0	7.4-8.4	1-5	---	0-4	0-4
	3-46	45-60	25.0-30.0	7.9-9.0	5-10	0-5	2-4	4-13
	46-60	45-60	25.0-30.0	7.9-9.0	5-10	1-5	8-16	13-38
30C:								
Marvan-----	0-3	40-60	25.0-30.0	7.4-8.4	1-5	---	0-4	0-4
	3-46	45-60	25.0-30.0	7.9-9.0	5-10	0-5	2-4	4-13
	46-60	45-60	25.0-30.0	7.9-9.0	5-10	1-5	8-16	13-38
31A:								
Ferd-----	0-3	20-27	10.0-20.0	6.6-7.3	---	---	---	---
	3-8	22-35	10.0-25.0	6.6-7.8	---	---	---	---
	8-13	35-50	15.0-30.0	6.6-8.4	---	---	0-2	---
	13-32	27-40	10.0-25.0	7.9-9.0	5-15	---	2-8	0-13
	32-60	27-40	10.0-25.0	7.9-9.6	5-15	1-3	4-8	8-13
32B:								
Kobase-----	0-6	35-40	20.0-25.0	7.4-8.4	1-5	---	0-2	---
	6-25	35-45	20.0-25.0	7.4-8.4	2-10	---	0-2	---
	25-60	35-45	15.0-20.0	7.9-9.0	5-15	1-5	0-4	5-10
32C:								
Kobase-----	0-6	35-40	20.0-25.0	7.4-8.4	1-5	---	0-2	---
	6-25	35-45	20.0-25.0	7.4-8.4	2-10	---	0-2	---
	25-60	35-45	15.0-20.0	7.9-9.0	5-15	1-5	0-4	5-10
32D:								
Kobase-----	0-6	35-40	20.0-25.0	7.4-8.4	1-5	---	0-2	---
	6-25	35-45	20.0-25.0	7.4-8.4	2-10	---	0-2	---
	25-60	35-45	15.0-20.0	7.9-9.0	5-15	1-5	0-4	5-10
33A:								
Phillips-----	0-8	15-27	10.0-15.0	6.1-7.3	---	---	0-2	---
	8-15	35-45	25.0-30.0	6.6-7.8	---	---	0-2	---
	15-32	25-40	15.0-20.0	7.4-8.4	5-15	---	0-4	---
	32-60	25-40	15.0-20.0	7.4-8.4	5-10	---	4-8	0-13
34A:								
Linnet-----	0-7	40-45	20.0-30.0	6.1-7.3	---	---	---	---
	7-14	45-60	20.0-30.0	6.6-7.8	---	---	---	---
	14-36	35-50	20.0-25.0	7.4-8.4	5-15	---	---	---
	36-60	35-50	20.0-25.0	7.9-9.0	1-5	1-5	0-4	2-13

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
35B:								
Assinniboine-----	0-6	5-15	10.0-15.0	6.1-7.8	---	---	---	---
	6-16	18-30	15.0-20.0	6.6-7.8	---	---	0-2	---
	16-48	10-27	10.0-15.0	7.4-8.4	5-15	---	0-2	---
	48-60	0-15	5.0-10.0	7.4-8.4	5-10	---	0-2	---
36B:								
Chinook-----	0-5	5-18	10.0-15.0	6.6-8.4	---	---	0-2	---
	5-24	5-18	5.0-10.0	6.6-8.4	---	---	0-2	---
	24-60	5-15	5.0-10.0	7.4-8.4	3-15	---	0-2	---
36C:								
Chinook-----	0-5	5-18	10.0-15.0	6.6-8.4	---	---	0-2	---
	5-24	5-18	5.0-10.0	6.6-8.4	---	---	0-2	---
	24-60	5-15	5.0-10.0	7.4-8.4	3-15	---	0-2	---
37B:								
Evanston-----	0-6	20-27	15.0-20.0	6.6-7.8	---	---	---	---
	6-14	25-35	20.0-25.0	6.6-7.8	---	---	---	---
	14-25	20-35	20.0-25.0	7.4-8.4	5-15	---	0-2	---
	25-60	15-30	10.0-15.0	7.9-8.4	5-15	0-2	0-4	---
37C:								
Evanston-----	0-6	20-27	15.0-20.0	6.6-7.8	---	---	---	---
	6-14	25-35	20.0-25.0	6.6-7.8	---	---	---	---
	14-25	20-35	20.0-25.0	7.4-8.4	5-15	---	0-2	---
	25-60	15-30	10.0-15.0	7.9-8.4	5-15	0-2	0-4	---
38B:								
Ethridge-----	0-6	27-35	20.0-25.0	6.6-7.8	---	---	---	---
	6-14	35-45	25.0-30.0	6.6-7.8	---	---	---	---
	14-32	30-45	20.0-25.0	7.4-8.4	5-15	---	---	1-5
	32-60	27-40	20.0-25.0	7.4-8.4	5-15	1-3	2-4	1-5
39B:								
Assinniboine-----	0-6	10-25	10.0-15.0	6.6-7.8	---	---	---	---
	6-17	18-30	10.0-20.0	6.6-7.8	---	---	0-2	---
	17-45	10-27	5.0-10.0	7.4-8.4	5-15	---	0-2	---
	45-60	0-15	0.0-5.0	7.4-8.4	5-15	---	0-2	---
43A:								
Pendroy-----	0-5	60-75	40.0-45.0	7.4-8.4	0-1	---	0-4	---
	5-44	60-75	35.0-40.0	7.4-8.4	1-5	---	2-4	---
	44-60	50-65	30.0-35.0	7.9-8.4	1-5	2-6	2-4	---
44B:								
Kevin-----	0-6	27-32	15.0-20.0	6.6-7.8	---	---	---	---
	6-9	35-45	20.0-25.0	6.6-8.4	---	---	---	---
	9-31	27-35	10.0-15.0	7.4-8.4	5-15	---	0-2	---
	31-60	27-35	10.0-15.0	7.9-8.4	1-10	0-2	0-2	---
47B:								
Marias-----	0-6	40-60	30.0-35.0	7.4-8.4	1-5	---	0-4	1-4
	6-38	40-60	25.0-35.0	7.9-8.4	2-10	---	0-4	1-4
	38-60	40-60	25.0-30.0	7.9-9.0	5-10	1-6	2-8	4-13
47C:								
Marias-----	0-6	40-60	30.0-35.0	7.4-8.4	1-5	---	0-4	1-4
	6-38	40-60	25.0-35.0	7.9-8.4	2-10	---	0-4	1-4
	38-60	40-60	25.0-30.0	7.9-9.0	5-10	1-6	2-8	4-13

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
48A:								
Vanda-----	0-7	40-60	25.0-35.0	7.9-9.6	1-5	---	2-8	5-30
	7-60	35-60	20.0-30.0	7.9-9.6	1-5	0-5	8-16	13-30
48C:								
Vanda-----	0-7	40-60	25.0-35.0	7.9-9.6	1-5	---	2-8	5-30
	7-60	35-60	20.0-30.0	7.9-9.6	1-5	0-5	8-16	13-30
50A:								
Telstad-----	0-5	18-27	15.0-20.0	6.6-7.8	---	---	---	---
	5-14	25-35	20.0-25.0	6.6-8.4	---	---	---	---
	14-38	20-32	15.0-20.0	7.9-8.4	3-15	---	2-4	---
	38-60	20-32	15.0-20.0	7.9-9.0	---	---	2-4	---
55B:								
Lihen-----	0-12	5-10	5.0-10.0	6.6-7.8	---	---	---	---
	12-60	0-10	1.0-5.0	7.4-8.4	0-15	---	---	---
56A:								
Scobey-----	0-6	27-35	20.0-25.0	6.1-7.8	---	---	---	---
	6-15	35-45	25.0-30.0	6.6-8.4	---	---	0-2	---
	15-60	30-40	15.0-20.0	7.4-9.0	5-15	0-6	0-2	0-8
57B:								
Absarokee-----	0-7	27-35	25.0-30.0	6.1-7.3	---	---	0-2	---
	7-18	35-50	25.0-35.0	6.6-7.8	---	---	0-2	---
	18-34	30-40	15.0-20.0	7.4-8.4	5-15	---	0-2	---
	34-60	---	---	---	---	---	---	---
57C:								
Absarokee-----	0-7	27-35	25.0-30.0	6.1-7.3	---	---	0-2	---
	7-18	35-50	25.0-35.0	6.6-7.8	---	---	0-2	---
	18-34	30-40	15.0-20.0	7.4-8.4	5-15	---	0-2	---
	34-60	---	---	---	---	---	---	---
57E:								
Absarokee-----	0-7	27-35	25.0-30.0	6.1-7.3	---	---	0-2	---
	7-18	35-50	25.0-35.0	6.6-7.8	---	---	0-2	---
	18-34	30-40	15.0-20.0	7.4-8.4	5-15	---	0-2	---
	34-60	---	---	---	---	---	---	---
Reeder-----	0-7	15-27	15.0-20.0	6.1-7.8	---	---	---	---
	7-12	18-35	15.0-25.0	6.6-7.8	---	---	---	---
	12-34	15-30	15.0-20.0	7.4-8.4	6-20	---	0-2	---
	34-60	---	---	---	---	---	---	---
58B:								
Lonna-----	0-6	27-35	15.0-20.0	7.4-8.4	5-10	---	0-2	---
	6-11	18-35	10.0-15.0	7.4-8.4	5-10	---	0-2	---
	11-34	18-35	10.0-15.0	7.9-9.0	5-15	---	2-4	1-13
	34-60	10-35	5.0-15.0	7.9-9.0	5-15	---	2-8	10-20
58C:								
Lonna-----	0-6	27-35	15.0-20.0	7.4-8.4	5-10	---	0-2	---
	6-11	18-35	10.0-15.0	7.4-8.4	5-10	---	0-2	---
	11-34	18-35	10.0-15.0	7.9-9.0	5-15	---	2-4	1-13
	34-60	10-35	5.0-15.0	7.9-9.0	5-15	---	2-8	10-20

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
60A:								
Havre-----	0-6	20-27	15.0-20.0	6.6-7.8	1-5	---	0-2	---
	6-60	18-35	15.0-25.0	7.4-8.4	1-5	---	0-4	---
63:								
Lardell-----	0-4	40-55	30.0-35.0	7.9-10.0	---	---	16-30	8-50
	4-38	35-50	20.0-25.0	8.5-10.0	1-5	---	16-50	13-80
	38-60	30-45	15.0-20.0	8.5-10.0	1-5	---	16-50	30-60
67B:								
Bearpaw-----	0-6	27-35	20.0-25.0	6.1-7.8	---	---	---	---
	6-16	35-50	25.0-30.0	6.6-7.8	---	---	---	---
	16-34	35-45	20.0-25.0	7.4-8.4	5-15	---	2-4	1-5
	34-60	30-45	20.0-25.0	7.4-8.4	5-10	0-2	2-8	5-8
67C:								
Bearpaw-----	0-6	27-35	20.0-25.0	6.1-7.8	---	---	---	---
	6-16	35-50	25.0-30.0	6.6-7.8	---	---	---	---
	16-34	35-45	20.0-25.0	7.4-8.4	5-15	---	2-4	1-5
	34-60	30-45	20.0-25.0	7.4-8.4	5-10	0-2	2-8	5-8
68B:								
Gerber-----	0-7	40-50	25.0-30.0	6.6-7.8	---	---	---	---
	7-16	45-60	25.0-30.0	7.4-8.4	---	---	0-2	---
	16-46	35-50	20.0-25.0	7.4-8.4	5-15	---	2-4	---
	46-60	35-50	20.0-25.0	7.4-8.4	5-10	---	2-4	---
69C:								
Vida-----	0-5	27-30	15.0-20.0	6.6-7.8	---	---	0-2	---
	5-15	25-35	15.0-20.0	6.6-7.8	---	---	0-2	---
	15-60	25-35	15.0-20.0	7.9-8.4	2-15	0-5	0-2	---
Zahill-----	0-3	27-35	20.0-25.0	7.4-8.4	5-10	---	0-2	---
	3-18	20-35	15.0-20.0	7.4-8.4	8-15	---	0-2	---
	18-60	20-35	15.0-20.0	7.4-9.0	2-12	1-5	0-2	---
71D:								
Roy-----	0-7	27-40	25.0-30.0	6.1-7.8	---	---	---	---
	7-15	35-50	25.0-30.0	6.6-7.8	---	---	---	---
	15-60	27-40	20.0-25.0	7.4-8.4	---	---	0-4	---
72F:								
Zahill-----	0-3	27-35	20.0-25.0	7.4-8.4	5-10	---	0-2	---
	3-18	20-35	15.0-20.0	7.4-8.4	8-15	---	0-2	---
	18-60	20-35	15.0-20.0	7.4-9.0	2-12	1-5	0-2	---
73B:								
Yetull-----	0-5	0-10	5.0-10.0	7.4-8.4	---	---	---	---
	5-60	0-10	1.0-5.0	7.4-8.4	1-5	---	0-4	---
Lonesome-----	0-6	5-15	5.0-10.0	7.4-7.8	---	---	---	---
	6-32	5-15	0.0-10.0	6.6-7.8	---	---	---	---
	32-60	20-35	10.0-20.0	7.9-9.0	5-15	---	0-4	0-13
74C:								
Shambo-----	0-6	20-27	15.0-20.0	6.6-7.8	---	---	---	---
	6-15	18-35	10.0-15.0	6.6-8.4	---	---	---	---
	15-60	18-35	10.0-15.0	7.4-9.0	5-20	---	---	1-5

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction pH	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
75B:								
Farnuf-----	0-6	15-27	10.0-15.0	6.1-7.8	---	---	---	---
	6-18	25-35	15.0-20.0	6.6-7.8	---	---	---	---
	18-46	20-30	10.0-15.0	7.4-8.4	5-15	---	0-2	---
	46-60	15-30	10.0-15.0	7.4-8.4	5-10	---	2-8	5-10
75C:								
Farnuf-----	0-6	15-27	10.0-15.0	6.1-7.8	---	---	---	---
	6-18	25-35	15.0-20.0	6.6-7.8	---	---	---	---
	18-46	20-30	10.0-15.0	7.4-8.4	5-15	---	0-2	---
	46-60	15-30	10.0-15.0	7.4-8.4	5-10	---	2-8	5-10
76C:								
Hedoes-----	0-5	10-15	15.0-20.0	6.6-7.3	---	---	---	---
	5-20	10-18	15.0-20.0	6.6-8.4	---	---	---	---
	20-31	5-18	5.0-10.0	6.6-8.4	---	---	0-4	---
	31-60	0-10	1.0-5.0	7.4-8.4	5-10	---	0-4	---
77F:								
Tinsley-----	0-6	5-10	5.0-10.0	6.6-7.8	---	---	---	---
	6-60	0-10	1.0-5.0	7.4-8.4	---	---	0-2	---
79B:								
Yamacall-----	0-4	18-27	15.0-20.0	6.6-8.4	---	---	---	---
	4-12	18-35	10.0-15.0	6.6-8.4	---	---	---	---
	12-60	18-35	10.0-15.0	7.9-8.4	5-15	0-1	0-4	1-5
79C:								
Yamacall-----	0-4	18-27	15.0-20.0	6.6-8.4	---	---	---	---
	4-12	18-35	10.0-15.0	6.6-8.4	---	---	---	---
	12-60	18-35	10.0-15.0	7.9-8.4	5-15	0-1	0-4	1-5
79D:								
Yamacall-----	0-4	18-27	15.0-20.0	6.6-8.4	---	---	---	---
	4-12	18-35	10.0-15.0	6.6-8.4	---	---	---	---
	12-60	18-35	10.0-15.0	7.9-8.4	5-15	0-1	0-4	1-5
81A:								
Glendive-----	0-6	5-15	10.0-15.0	6.6-8.4	---	---	0-4	---
	6-29	5-18	10.0-15.0	7.4-9.0	1-5	---	0-4	---
	29-60	5-18	10.0-15.0	7.4-9.0	1-10	---	2-8	---
82B:								
Savage-----	0-6	27-35	25.0-30.0	6.1-7.8	---	---	---	---
	6-16	35-50	30.0-35.0	6.1-8.4	---	---	0-4	---
	16-60	30-45	25.0-30.0	7.4-8.4	5-15	---	0-4	---
86B:								
Work-----	0-6	27-35	20.0-25.0	6.1-7.3	---	---	---	---
	6-22	35-50	20.0-25.0	6.6-7.8	---	---	---	---
	22-48	20-40	15.0-20.0	7.4-8.4	3-15	---	0-4	---
	48-60	15-40	10.0-15.0	7.4-8.4	5-15	---	0-4	---
86C:								
Work-----	0-6	27-35	20.0-25.0	6.1-7.3	---	---	---	---
	6-22	35-50	20.0-25.0	6.6-7.8	---	---	---	---
	22-48	20-40	15.0-20.0	7.4-8.4	3-15	---	0-4	---
	48-60	15-40	10.0-15.0	7.4-8.4	5-15	---	0-4	---

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
86D:								
Work-----	0-6	27-35	20.0-25.0	6.1-7.3	---	---	---	---
	6-22	35-50	20.0-25.0	6.6-7.8	---	---	---	---
	22-48	20-40	15.0-20.0	7.4-8.4	3-15	---	0-4	---
	48-60	15-40	10.0-15.0	7.4-8.4	5-15	---	0-4	---
87B:								
Tamaneen-----	0-5	27-35	25.0-30.0	6.6-7.8	---	---	---	---
	5-14	35-50	30.0-35.0	6.6-7.8	---	---	---	---
	14-19	30-45	25.0-30.0	7.4-8.4	20-30	---	0-2	---
	19-29	18-35	20.0-25.0	7.9-8.4	20-30	---	0-2	---
	29-60	8-25	5.0-10.0	7.9-8.4	25-40	---	0-2	---
88C:								
Perma-----	0-10	7-20	10.0-20.0	6.6-7.3	---	---	---	---
	10-38	7-27	10.0-15.0	6.6-7.8	---	---	---	---
	38-60	0-15	1.0-5.0	6.6-7.8	---	---	---	---
90A:								
Harlake-----	0-8	40-55	30.0-35.0	7.4-8.4	1-5	---	0-4	0-4
	8-48	35-60	25.0-35.0	7.4-8.4	5-10	---	0-4	4-10
	48-60	15-35	15.0-20.0	7.9-9.0	5-10	---	0-8	4-10
92E:								
Sunburst-----	0-5	35-40	20.0-25.0	7.4-8.4	5-10	---	0-2	---
	5-20	35-50	20.0-25.0	7.9-8.4	5-15	---	2-4	---
	20-60	35-50	20.0-25.0	7.9-9.0	5-15	1-3	2-8	---
Bascovy-----	0-4	40-60	30.0-40.0	6.6-7.8	---	---	2-4	1-5
	4-15	45-60	30.0-35.0	6.1-7.8	0-5	---	2-4	5-10
	15-29	45-60	30.0-35.0	5.1-7.3	---	1-5	2-8	10-15
	29-60	---	---	---	---	---	---	---
93F:								
Yetull-----	0-8	0-10	5.0-10.0	7.4-7.8	---	---	---	---
	8-60	0-10	1.0-5.0	7.4-8.4	1-5	---	0-4	---
94B:								
Busby-----	0-4	10-18	10.0-15.0	7.4-8.4	---	---	---	---
	4-11	10-18	10.0-15.0	7.4-8.4	---	---	---	---
	11-28	10-18	5.0-15.0	7.9-8.4	5-15	---	0-2	---
	28-60	3-18	5.0-10.0	7.9-8.4	5-15	---	0-4	---
94C:								
Busby-----	0-4	10-18	10.0-15.0	7.4-8.4	---	---	---	---
	4-11	10-18	10.0-15.0	7.4-8.4	---	---	---	---
	11-28	10-18	5.0-15.0	7.9-8.4	5-15	---	0-2	---
	28-60	3-18	5.0-10.0	7.9-8.4	5-15	---	0-4	---
94D:								
Busby-----	0-4	10-18	10.0-15.0	7.4-8.4	---	---	---	---
	4-11	10-18	10.0-15.0	7.4-8.4	---	---	---	---
	11-28	10-18	5.0-15.0	7.9-8.4	5-15	---	0-2	---
	28-60	3-18	5.0-10.0	7.9-8.4	5-15	---	0-4	---

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meg/100g	pH	Pct	Pct	mmhos/cm	
96B:								
Macar-----	0-6	18-27	15.0-20.0	6.6-8.4	---	---	---	---
	6-15	18-35	15.0-20.0	6.6-8.4	---	---	0-2	---
	15-45	18-35	15.0-20.0	7.4-8.4	8-15	---	0-2	---
	45-60	15-30	10.0-15.0	7.4-8.4	5-12	---	0-2	---
96C:								
Macar-----	0-6	18-27	15.0-20.0	6.6-8.4	---	---	---	---
	6-15	18-35	15.0-20.0	6.6-8.4	---	---	0-2	---
	15-45	18-35	15.0-20.0	7.4-8.4	8-15	---	0-2	---
	45-60	15-30	10.0-15.0	7.4-8.4	5-12	---	0-2	---
98B:								
Kremlin-----	0-6	18-27	15.0-20.0	6.1-7.8	---	---	---	---
	6-11	18-30	10.0-15.0	6.6-7.8	---	---	---	---
	11-30	18-30	10.0-15.0	7.4-8.4	5-15	---	0-2	---
	30-60	10-25	5.0-10.0	7.4-8.4	3-12	---	0-4	---
98C:								
Kremlin-----	0-6	18-27	15.0-20.0	6.1-7.8	---	---	---	---
	6-11	18-30	10.0-15.0	6.6-7.8	---	---	---	---
	11-30	18-30	10.0-15.0	7.4-8.4	5-15	---	0-2	---
	30-60	10-25	5.0-10.0	7.4-8.4	3-12	---	0-4	---
99:								
Rivra-----	0-6	5-15	5.0-10.0	6.6-8.4	---	---	0-2	---
	6-60	0-5	1.0-5.0	7.4-8.4	---	---	0-2	---
Hanly-----	0-5	5-10	5.0-10.0	6.6-8.4	0-5	---	---	---
	5-60	5-10	5.0-10.0	7.4-8.4	0-5	---	---	---
110C:								
Laceycreek-----	0-18	15-24	15.0-25.0	6.1-7.3	---	---	---	---
	18-26	24-35	15.0-25.0	6.1-7.3	---	---	---	---
	26-44	20-35	15.0-25.0	6.6-7.3	---	---	---	---
	44-60	5-20	5.0-15.0	6.6-7.3	0-2	---	---	---
110D:								
Laceycreek-----	0-18	15-24	15.0-25.0	6.1-7.3	---	---	---	---
	18-26	24-35	15.0-25.0	6.1-7.3	---	---	---	---
	26-44	20-35	15.0-25.0	6.6-7.3	---	---	---	---
	44-60	5-20	5.0-15.0	6.6-7.3	0-2	---	---	---
110E:								
Laceycreek-----	0-18	15-24	15.0-25.0	6.1-7.3	---	---	---	---
	18-26	24-35	15.0-25.0	6.1-7.3	---	---	---	---
	26-44	20-35	15.0-25.0	6.6-7.3	---	---	---	---
	44-60	5-20	5.0-15.0	6.6-7.3	0-2	---	---	---
130A:								
Nesda-----	0-12	10-20	15.0-20.0	6.6-7.8	1-5	---	---	---
	12-60	0-10	1.0-5.0	7.4-8.4	1-5	---	0-2	---
Nesda-----	0-10	10-20	15.0-20.0	6.6-7.8	1-5	---	---	---
	10-60	0-10	1.0-5.0	7.4-8.4	1-5	---	0-2	---
McIlwaine-----	0-6	5-18	10.0-15.0	6.6-7.3	---	---	---	---
	6-26	5-18	5.0-15.0	6.6-7.3	---	---	---	---
	26-60	0-5	1.0-5.0	6.6-7.8	---	---	---	---

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
140A:								
Klayent-----	0-6	27-40	20.0-25.0	6.6-8.4	1-5	---	0-2	---
	6-20	35-50	20.0-25.0	7.9-9.0	2-10	---	2-8	---
	20-32	30-45	15.0-20.0	7.9-9.0	5-10	---	2-8	---
	32-60	30-45	15.0-20.0	7.9-9.0	5-10	---	2-4	---
141B:								
Megonot-----	0-6	35-40	25.0-30.0	6.6-7.8	---	---	---	---
	6-26	35-45	20.0-25.0	7.4-8.4	1-15	---	0-4	---
	26-60	---	---	---	---	---	---	---
Weingart-----	0-7	35-40	30.0-35.0	6.6-7.8	---	---	0-2	10-20
	7-10	40-60	30.0-35.0	7.4-9.6	---	---	0-8	10-30
	10-28	35-55	30.0-35.0	7.9-9.6	2-15	0-5	4-16	13-30
	28-60	---	---	---	---	---	---	---
Delpoint-----	0-4	18-27	15.0-20.0	7.4-8.4	5-10	---	0-4	---
	4-12	18-35	15.0-20.0	7.9-8.4	5-10	---	0-4	---
	12-30	18-35	10.0-15.0	7.9-8.4	5-15	---	0-4	---
	30-60	---	---	---	---	---	---	---
142C:								
Megonot-----	0-6	35-40	25.0-30.0	6.6-7.8	---	---	---	---
	6-26	35-45	20.0-25.0	7.4-8.4	1-15	---	0-4	---
	26-60	---	---	---	---	---	---	---
Kobase-----	0-6	35-40	20.0-25.0	7.4-8.4	1-5	---	0-2	---
	6-25	35-45	20.0-25.0	7.4-8.4	2-10	---	0-2	---
	25-60	35-45	15.0-20.0	7.9-9.0	5-15	1-5	0-4	5-10
Delpoint-----	0-4	18-27	15.0-20.0	7.4-8.4	5-10	---	0-4	---
	4-12	18-35	15.0-20.0	7.9-8.4	5-10	---	0-4	---
	12-30	18-35	10.0-15.0	7.9-8.4	5-15	---	0-4	---
	30-60	---	---	---	---	---	---	---
160A:								
Bigsandy-----	0-3	15-27	20.0-25.0	7.4-9.0	---	---	0-4	0-4
	3-11	18-35	20.0-25.0	7.9-9.0	15-30	---	0-4	0-4
	11-32	18-35	15.0-20.0	8.5-9.0	15-30	---	4-8	5-13
	32-60	15-35	15.0-20.0	8.5-9.0	5-15	1-3	8-16	5-13
171C:								
Delpoint-----	0-4	18-27	15.0-20.0	7.4-8.4	5-10	---	0-4	---
	4-12	18-35	15.0-20.0	7.9-8.4	5-10	---	0-4	---
	12-30	18-35	10.0-15.0	7.9-8.4	5-15	---	0-4	---
	30-60	---	---	---	---	---	---	---
Cabbart-----	0-4	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	4-18	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	18-60	---	---	---	---	---	---	---
180A:								
McIlwaine-----	0-6	5-18	10.0-15.0	6.6-7.3	---	---	---	---
	6-26	5-18	5.0-10.0	6.6-7.8	---	---	---	---
	26-60	0-5	0.0-5.0	6.6-7.8	---	---	---	---
Nesda-----	0-12	10-20	15.0-20.0	6.6-7.8	1-5	---	---	---
	12-60	0-10	1.0-5.0	7.4-8.4	1-5	---	0-2	---

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meg/100g	pH	Pct	Pct	mmhos/cm	
180A: (cont.)								
Straw-----	0-8	18-27	15.0-25.0	6.6-8.4	0-5	---	0-2	---
	8-42	18-35	15.0-25.0	6.6-8.4	3-15	---	0-2	---
	42-60	5-20	10.0-15.0	7.4-8.4	2-12	---	0-2	---
182F:								
Megonot-----	0-4	35-45	25.0-30.0	6.6-7.8	---	---	---	---
	4-16	35-45	20.0-25.0	7.4-8.4	1-15	---	0-4	---
	16-28	35-45	20.0-25.0	6.6-8.4	0-5	---	0-4	---
	28-60	---	---	---	---	---	---	---
Yawdim-----	0-3	27-40	20.0-25.0	6.6-7.8	---	---	---	---
	3-16	35-50	20.0-25.0	7.4-8.4	---	---	0-2	---
	16-60	---	---	---	---	---	---	---
200:								
Badland-----								
201F:								
Cabba-----	0-3	20-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	3-15	20-35	5.0-10.0	7.4-9.0	5-15	---	2-8	---
	15-60	---	---	---	---	---	---	---
Wayden-----	0-3	35-40	15.0-30.0	7.4-8.4	---	---	0-4	---
	3-18	35-50	15.0-30.0	7.4-8.4	---	---	0-8	---
	18-60	---	---	---	---	---	---	---
Rock outcrop---								
210C:								
Shane-----	0-7	27-35	25.0-30.0	5.6-7.3	---	---	---	---
	7-18	45-60	35.0-45.0	6.1-7.8	---	---	---	---
	18-36	35-55	25.0-35.0	7.9-8.4	5-15	---	0-4	---
	36-60	---	---	---	---	---	---	---
Gerber-----	0-6	40-50	25.0-30.0	6.6-7.8	---	---	---	---
	6-14	45-60	25.0-30.0	7.4-8.4	---	---	0-2	---
	14-30	35-50	20.0-25.0	7.4-8.4	5-15	---	2-4	---
	30-60	35-50	20.0-25.0	7.4-8.4	5-10	---	2-4	---
210E:								
Shane-----	0-7	27-35	25.0-30.0	5.6-7.3	---	---	---	---
	7-18	45-60	35.0-45.0	6.1-7.8	---	---	---	---
	18-36	35-55	25.0-35.0	7.9-8.4	5-15	---	0-4	---
	36-60	---	---	---	---	---	---	---
Barkof-----	0-6	45-55	30.0-40.0	7.4-8.4	1-5	---	0-2	---
	6-32	45-60	30.0-35.0	7.9-9.0	5-10	---	0-4	1-5
	32-60	---	---	---	---	---	---	---
Gerber-----	0-6	40-50	25.0-30.0	6.6-7.8	---	---	---	---
	6-14	45-60	25.0-30.0	7.4-8.4	---	---	0-2	---
	14-30	35-50	20.0-25.0	7.4-8.4	5-15	---	2-4	---
	30-60	35-50	20.0-25.0	7.4-8.4	5-10	---	2-4	---
211F:								
Cabbart-----	0-4	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	4-18	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	18-60	---	---	---	---	---	---	---

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
211F: (cont.)								
Yawdim-----	0-3	27-40	20.0-25.0	6.6-7.8	---	---	---	---
	3-16	35-50	20.0-25.0	7.4-8.4	---	---	0-2	---
	16-60	---	---	---	---	---	---	---
Rock outcrop----								
212F:								
Cabbart-----	0-4	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	4-18	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	18-60	---	---	---	---	---	---	---
Hillon-----	0-4	20-27	20.0-25.0	7.4-8.4	5-10	---	0-2	---
	4-60	20-35	15.0-20.0	7.9-9.0	5-15	---	0-2	---
221E:								
Hillon-----	0-4	27-35	15.0-20.0	7.4-8.4	5-10	---	0-2	---
	4-60	20-35	15.0-20.0	7.9-9.0	5-15	---	0-2	---
Kevin-----	0-6	27-32	15.0-20.0	6.6-7.8	---	---	---	---
	6-9	35-45	20.0-25.0	6.6-8.4	---	---	---	---
	9-31	27-35	10.0-15.0	7.4-8.4	5-15	---	0-2	---
	31-60	27-35	10.0-15.0	7.9-9.0	1-10	0-2	0-2	---
222D:								
Hillon-----	0-4	20-27	20.0-25.0	7.4-8.4	5-10	---	0-2	---
	4-60	20-35	15.0-20.0	7.9-9.0	5-15	---	0-2	---
Delpoint-----	0-4	18-27	15.0-20.0	7.4-8.4	5-10	---	0-4	---
	4-12	18-35	15.0-20.0	7.9-8.4	5-10	---	0-4	---
	12-30	18-35	10.0-15.0	7.9-8.4	5-15	---	0-4	---
	30-60	---	---	---	---	---	---	---
223E:								
Hillon-----	0-4	20-27	20.0-25.0	7.4-8.4	5-10	---	0-2	---
	4-60	20-35	15.0-20.0	7.9-9.0	5-15	---	0-2	---
Fleak-----	0-3	0-10	5.0-10.0	6.6-7.8	---	---	---	---
	3-18	0-10	1.0-5.0	6.6-8.4	---	---	---	---
	18-60	---	---	---	---	---	---	---
224E:								
Hillon-----	0-4	20-27	20.0-25.0	7.4-8.4	5-10	---	0-2	---
	4-60	20-35	15.0-20.0	7.9-9.0	5-15	---	0-2	---
Joplin-----	0-6	18-27	10.0-15.0	6.6-7.8	---	---	---	---
	6-9	25-35	15.0-20.0	6.6-7.8	---	---	---	---
	9-38	18-35	10.0-15.0	7.4-8.4	5-15	---	0-2	---
	38-60	18-32	10.0-15.0	7.4-8.4	5-10	---	2-8	---
227F:								
Hillon-----	0-4	20-27	20.0-25.0	7.4-8.4	5-10	---	0-2	---
	4-60	20-35	15.0-20.0	7.9-9.0	5-15	---	0-2	---
Fleak-----	0-3	0-10	5.0-10.0	6.6-7.8	---	---	---	---
	3-18	0-10	1.0-5.0	6.6-8.4	---	---	---	---
	18-60	---	---	---	---	---	---	---
Rock outcrop----								

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
229E:								
Hillon-----	0-4	27-35	15.0-20.0	7.4-8.4	5-10	---	0-2	---
	4-60	20-35	15.0-20.0	7.9-9.0	5-15	---	0-2	---
Lambeth-----	0-4	20-27	15.0-20.0	6.6-8.4	5-10	---	---	---
	4-60	20-35	15.0-20.0	7.9-9.0	10-15	1-5	0-4	1-5
232A:								
Acel-----	0-6	27-35	15.0-20.0	6.6-7.8	---	---	---	---
	6-20	40-55	25.0-30.0	6.6-7.8	---	---	---	---
	20-60	35-45	15.0-20.0	7.9-9.0	1-15	---	0-2	---
251C:								
Bascovy-----	0-4	40-60	30.0-40.0	6.6-7.8	---	---	2-4	1-5
	4-15	45-60	30.0-35.0	6.1-7.8	0-5	---	2-4	5-10
	15-29	45-60	30.0-35.0	5.1-7.3	---	1-5	2-8	10-15
	29-60	---	---	---	---	---	---	---
Neldore-----	0-4	40-50	30.0-35.0	5.6-7.8	---	---	0-2	---
	4-15	40-60	30.0-35.0	5.6-7.8	---	---	0-4	---
	15-60	---	---	---	---	---	---	---
251E:								
Bascovy-----	0-4	40-60	30.0-40.0	6.6-7.8	---	---	2-4	1-5
	4-15	45-60	30.0-35.0	6.1-7.8	0-5	---	2-4	5-10
	15-29	45-60	30.0-35.0	5.1-7.3	---	1-5	2-8	10-15
	29-60	---	---	---	---	---	---	---
Neldore-----	0-4	40-50	30.0-35.0	5.6-7.8	---	---	0-2	---
	4-15	40-60	30.0-35.0	5.6-7.8	---	---	0-4	---
	15-60	---	---	---	---	---	---	---
252C:								
Bascovy-----	0-4	40-60	30.0-40.0	6.6-7.8	---	---	2-4	1-5
	4-15	45-60	30.0-35.0	6.1-7.8	0-5	---	2-4	5-10
	15-29	45-60	30.0-35.0	5.1-7.3	---	1-5	2-8	10-15
	29-60	---	---	---	---	---	---	---
Marvan-----	0-3	40-60	25.0-30.0	7.4-8.4	1-5	---	0-4	0-4
	3-46	45-60	25.0-30.0	7.9-9.0	5-10	0-5	2-4	4-13
	46-60	45-60	25.0-30.0	7.9-9.0	5-10	1-5	8-16	13-38
261B:								
Absher-----	0-7	40-55	25.0-30.0	7.4-9.0	---	---	4-8	1-5
	7-11	35-60	25.0-30.0	7.4-9.0	---	---	8-16	18-70
	11-60	35-50	20.0-25.0	7.9-9.0	4-15	1-5	8-30	18-70
Nobe-----	0-7	40-50	25.0-30.0	6.6-8.4	1-5	---	4-8	10-15
	7-20	35-60	25.0-30.0	7.9-9.6	1-5	1-6	16-30	13-40
	20-60	35-60	25.0-30.0	7.9-9.6	1-5	1-6	16-30	13-70
263A:								
Toston-----	0-6	27-35	15.0-20.0	7.9-9.0	---	---	4-8	4-13
	6-9	35-45	20.0-25.0	7.9-9.0	---	1-3	4-16	13-30
	9-16	27-35	15.0-20.0	8.5-9.0	5-15	1-5	8-16	13-30
	16-60	18-30	10.0-15.0	7.9-9.0	2-15	0-2	8-16	13-30

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
264A:								
Toston-----	0-6	27-35	15.0-20.0	7.9-9.0	---	---	4-8	4-13
	6-9	35-45	20.0-25.0	7.9-9.0	---	---	4-16	13-30
	9-16	27-35	15.0-20.0	8.5-9.0	5-15	1-5	8-16	13-30
	16-60	18-30	10.0-15.0	7.9-9.0	2-15	0-2	8-16	13-30
Nobe-----	0-5	40-60	25.0-30.0	6.6-8.4	1-5	---	4-8	10-15
	5-38	35-60	25.0-30.0	7.9-9.6	1-5	1-6	16-30	13-40
	38-60	35-60	25.0-30.0	7.9-9.6	1-5	1-6	16-30	13-70
265B:								
Absher-----	0-7	40-55	25.0-30.0	7.4-9.0	---	---	4-8	1-5
	7-11	35-60	25.0-30.0	7.4-9.0	---	---	8-16	18-70
	11-60	35-50	20.0-25.0	7.9-9.0	4-15	1-5	8-30	18-70
Gerdrum-----	0-7	27-40	20.0-25.0	6.6-7.8	---	---	0-2	---
	7-16	35-55	25.0-35.0	7.4-9.0	---	---	1-8	10-20
	16-60	30-50	20.0-25.0	7.9-9.0	5-15	1-5	8-16	13-30
272C:								
Attewan-----	0-5	10-20	5.0-10.0	6.1-7.8	---	---	---	---
	5-17	20-35	15.0-20.0	6.6-7.8	---	---	---	---
	17-27	15-30	10.0-15.0	7.4-8.4	5-15	---	0-2	---
	27-60	0-10	1.0-5.0	7.4-8.4	5-10	---	0-2	---
Tinsley-----	0-6	5-10	5.0-10.0	6.6-7.8	---	---	---	---
	6-60	0-10	1.0-5.0	7.4-8.4	---	---	0-2	---
301A:								
Marvan-----	0-3	40-60	25.0-30.0	7.4-8.4	1-5	---	0-4	0-4
	3-46	45-60	25.0-30.0	7.9-9.0	5-10	0-5	2-4	4-13
	46-60	45-60	25.0-30.0	7.9-9.0	5-10	1-5	8-16	13-38
Vanda-----	0-7	40-60	25.0-35.0	7.9-9.6	1-5	---	2-8	5-30
	7-60	35-60	20.0-30.0	7.9-9.6	1-5	0-5	8-16	13-30
301C:								
Marvan-----	0-3	40-60	25.0-30.0	7.4-8.4	1-5	---	0-4	0-4
	3-46	45-60	25.0-30.0	7.9-9.0	5-10	0-5	2-4	4-13
	46-60	45-60	25.0-30.0	7.9-9.0	5-10	1-5	8-16	13-38
Vanda-----	0-7	40-60	25.0-35.0	7.9-9.6	1-5	---	2-8	5-30
	7-60	35-60	20.0-30.0	7.8-9.6	1-5	0-5	8-16	13-30
303A:								
Flatcreek-----	0-3	40-60	20.0-30.0	7.4-8.4	---	---	0-4	0-4
	3-11	40-60	20.0-30.0	7.9-9.0	1-3	0-1	2-8	4-13
	11-20	40-60	20.0-30.0	7.9-9.0	2-5	0-1	8-16	4-13
	20-60	40-60	20.0-30.0	7.9-9.0	2-5	0-2	8-16	4-13
Nobe-----	0-2	40-60	25.0-30.0	6.6-8.4	1-5	---	4-8	10-15
	2-60	35-60	25.0-30.0	7.9-9.6	1-5	1-6	16-30	13-70
305A:								
Marvan-----	0-7	40-60	30.0-35.0	7.9-9.0	1-5	---	2-8	8-18
	7-20	45-60	30.0-35.0	7.9-9.0	5-10	0-5	2-8	13-38
	20-60	45-60	25.0-30.0	7.9-9.0	5-10	1-5	8-16	13-38

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
305A: (cont.)								
Nobe-----	0-7	40-50	25.0-30.0	6.6-8.4	1-5	---	4-8	10-15
	7-20	35-60	25.0-30.0	7.9-9.6	1-5	1-6	16-30	13-40
	20-60	35-60	25.0-30.0	7.9-9.6	1-5	1-6	16-30	13-70
311B:								
Ferd-----	0-3	20-27	10.0-20.0	6.6-7.3	---	---	---	---
	3-8	22-35	10.0-25.0	6.6-7.8	---	---	---	---
	8-13	35-50	15.0-30.0	6.6-8.4	---	---	0-2	---
	13-32	27-40	10.0-25.0	7.9-9.0	5-15	---	2-8	0-13
	32-60	27-40	10.0-25.0	7.9-9.0	5-15	1-3	4-8	8-13
Creed-----	0-6	20-27	15.0-20.0	6.6-8.4	---	---	0-4	---
	6-12	35-55	25.0-35.0	6.6-9.0	---	---	2-4	8-13
	12-26	27-40	20.0-30.0	7.9-9.0	5-15	---	4-8	13-20
	26-60	25-35	15.0-20.0	7.9-9.0	5-10	---	4-16	13-25
Gerdum-----	0-7	27-40	20.0-25.0	6.6-7.8	---	---	0-2	---
	7-16	35-55	25.0-35.0	7.4-9.0	---	---	1-8	10-20
	16-60	30-50	20.0-25.0	7.9-9.0	5-15	1-5	8-16	13-30
311C:								
Ferd-----	0-3	20-27	10.0-20.0	6.6-7.3	---	---	---	---
	3-8	22-35	10.0-25.0	6.6-7.8	---	---	---	---
	8-13	35-50	15.0-30.0	6.6-8.4	---	---	0-2	---
	13-32	27-40	10.0-25.0	7.9-9.0	5-15	---	2-8	0-13
	32-60	27-40	10.0-25.0	7.9-9.0	5-15	1-3	4-8	8-13
Creed-----	0-6	20-27	15.0-20.0	6.6-8.4	---	---	0-4	---
	6-12	35-55	25.0-35.0	6.6-9.0	---	---	2-4	8-13
	12-26	27-40	20.0-30.0	7.9-9.0	5-15	---	4-8	13-20
	26-60	25-35	15.0-20.0	7.9-9.0	5-10	---	4-16	13-25
Gerdum-----	0-7	27-40	20.0-25.0	6.6-7.8	---	---	0-2	---
	7-16	35-55	25.0-35.0	7.4-9.0	---	---	1-8	10-20
	16-60	30-50	20.0-25.0	7.9-9.0	5-15	1-5	8-16	13-30
323B:								
Sagedale-----	0-4	35-40	20.0-25.0	7.4-8.4	---	---	---	---
	4-15	32-45	20.0-25.0	7.4-8.4	---	---	0-2	---
	15-30	35-45	20.0-25.0	7.4-8.4	5-15	---	0-4	---
	30-60	35-45	20.0-25.0	7.4-9.0	5-10	1-7	0-4	---
323C:								
Sagedale-----	0-4	35-40	20.0-25.0	7.4-8.4	---	---	---	---
	4-15	32-45	20.0-25.0	7.4-8.4	---	---	0-2	---
	15-30	35-45	20.0-25.0	7.4-8.4	5-15	---	0-4	---
	30-60	35-45	20.0-25.0	7.4-9.0	5-10	1-7	0-4	---
324B:								
Marcott-----	0-4	35-40	20.0-30.0	6.6-8.4	---	---	2-4	---
	4-15	35-50	15.0-30.0	7.4-8.4	0-2	---	2-8	---
	15-30	35-50	15.0-30.0	7.4-8.4	3-12	0-2	4-8	---
	30-60	35-50	15.0-30.0	7.4-9.0	5-15	0-2	4-8	---
331B:								
Phillips-----	0-8	15-27	10.0-15.0	6.1-7.3	---	---	0-2	---
	8-15	35-45	25.0-30.0	6.6-7.8	---	---	0-2	---
	15-32	25-40	15.0-20.0	7.4-8.4	5-15	---	0-4	---
	32-60	25-40	15.0-20.0	7.4-8.4	5-10	---	4-8	0-13

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
331B: (cont.)								
Elloam-----	0-7	27-35	20.0-25.0	6.6-7.8	---	---	0-2	---
	7-12	35-55	25.0-30.0	7.4-9.0	---	---	2-8	8-25
	12-18	30-45	20.0-25.0	7.9-9.0	5-15	---	4-8	13-25
	18-60	25-40	15.0-20.0	7.9-9.6	5-10	---	8-16	13-25
331C:								
Phillips-----	0-8	15-27	10.0-15.0	6.1-7.3	---	---	0-2	---
	8-15	35-45	25.0-30.0	6.6-7.8	---	---	0-2	---
	15-32	25-40	15.0-20.0	7.4-8.4	5-15	---	0-4	---
	32-60	25-40	15.0-20.0	7.4-8.4	5-10	---	4-8	0-13
Elloam-----	0-7	27-35	20.0-25.0	6.6-7.8	---	---	0-2	---
	7-12	35-55	25.0-30.0	7.4-9.0	---	---	2-8	8-25
	12-18	30-45	20.0-25.0	7.9-9.0	5-15	---	4-8	13-25
	18-60	25-40	15.0-20.0	7.9-9.6	5-10	---	8-16	13-25
334B:								
Phillips-----	0-8	15-27	10.0-15.0	6.1-7.3	---	---	0-2	---
	8-15	35-45	25.0-30.0	6.6-7.8	---	---	0-2	---
	15-32	25-40	15.0-20.0	7.4-8.4	5-15	---	0-4	---
	32-60	25-40	15.0-20.0	7.4-8.4	5-10	---	4-8	0-13
Kevin-----	0-6	27-32	15.0-20.0	6.6-7.8	---	---	---	---
	6-9	35-45	20.0-25.0	6.6-8.4	---	---	---	---
	9-31	27-35	10.0-15.0	7.4-8.4	5-15	---	0-2	---
	31-60	27-35	10.0-15.0	7.9-8.4	1-10	0-2	0-2	---
341B:								
Linnet-----	0-7	40-45	20.0-30.0	6.1-7.3	---	---	---	---
	7-14	45-60	20.0-30.0	6.6-7.8	---	---	---	---
	14-36	35-50	20.0-25.0	7.4-8.4	5-15	---	---	---
	36-60	35-50	20.0-25.0	7.9-9.0	1-5	1-5	0-4	2-13
Marias-----	0-6	40-60	30.0-35.0	7.4-8.4	1-5	---	0-4	1-4
	6-38	40-60	25.0-35.0	7.9-8.4	2-10	---	0-4	1-4
	38-60	40-60	25.0-30.0	7.9-9.0	5-10	1-6	2-8	4-13
351B:								
Kenilworth-----	0-5	5-18	15.0-20.0	6.6-7.8	---	---	---	---
	5-12	15-30	15.0-25.0	6.6-7.8	---	---	---	---
	12-16	20-35	20.0-30.0	6.6-7.8	---	---	---	---
	16-29	27-35	20.0-30.0	7.4-8.4	5-15	---	0-2	---
	29-60	27-35	20.0-30.0	7.9-9.0	5-15	1-3	0-4	---
Fortbenton-----	0-7	10-18	10.0-15.0	6.6-7.8	---	---	---	---
	7-24	10-18	5.0-10.0	6.6-7.8	---	---	---	---
	24-60	27-35	15.0-20.0	7.4-9.0	5-15	---	0-2	---
361B:								
Fortbenton-----	0-6	10-18	10.0-15.0	6.6-7.8	---	---	---	---
	6-23	10-18	5.0-10.0	6.6-7.8	---	---	---	---
	23-60	27-35	15.0-20.0	7.4-9.0	5-15	---	0-2	---
362C:								
Chinook-----	0-5	5-18	10.0-15.0	6.6-8.4	---	---	0-2	---
	5-24	5-18	5.0-10.0	6.6-8.4	---	---	0-2	---
	24-60	5-15	5.0-10.0	7.4-8.4	3-15	---	0-2	---

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meg/100g	pH	Pct	Pct	mmhos/cm	
362C: (cont.)								
Yetull-----	0-6	0-10	5.0-10.0	7.4-8.4	---	---	---	---
	6-60	0-10	1.0-5.0	7.4-8.4	1-5	---	0-4	---
363B:								
Cozberg-----	0-6	10-20	15.0-20.0	6.6-7.8	---	---	---	---
	6-34	10-18	10.0-15.0	6.6-7.8	0-15	---	---	---
	34-60	0-10	1.0-5.0	7.4-8.4	---	---	0-2	---
Chinook-----	0-5	5-18	10.0-15.0	6.6-8.4	---	---	0-2	---
	5-24	5-18	5.0-10.0	6.6-8.4	---	---	0-2	---
	24-60	5-15	5.0-10.0	7.4-8.4	3-15	---	0-2	---
363C:								
Chinook-----	0-5	5-18	10.0-15.0	6.6-8.4	---	---	0-2	---
	5-24	5-18	5.0-10.0	6.6-8.4	---	---	0-2	---
	24-60	5-15	5.0-10.0	7.4-8.4	3-15	---	0-2	---
Lihe-----	0-12	10-20	10.0-15.0	6.6-7.8	---	---	---	---
	12-60	0-10	1.0-5.0	7.4-8.4	0-15	---	---	---
364B:								
Chinook-----	0-11	15-20	15.0-20.0	6.6-8.4	---	---	0-2	---
	11-35	5-18	5.0-10.0	6.6-8.4	---	---	0-2	---
	35-60	5-15	5.0-10.0	7.4-8.4	3-15	---	0-2	---
364C:								
Chinook-----	0-11	15-20	15.0-20.0	6.6-8.4	---	---	0-2	---
	11-35	5-18	5.0-10.0	6.6-8.4	---	---	0-2	---
	35-60	5-15	5.0-10.0	7.4-8.4	3-15	---	0-2	---
365B:								
Fortbenton-----	0-6	10-18	10.0-15.0	6.6-7.8	---	---	---	---
	6-23	10-18	5.0-10.0	6.6-7.8	---	---	---	---
	23-60	27-35	15.0-20.0	7.4-9.0	5-15	---	0-2	---
Chinook-----	0-5	5-18	10.0-15.0	6.6-8.4	---	---	0-2	---
	5-24	5-18	5.0-10.0	6.6-8.4	---	---	0-2	---
	24-60	5-15	5.0-10.0	7.4-8.4	3-15	---	0-2	---
368C:								
Fortbenton-----	0-7	10-18	10.0-15.0	6.6-7.8	---	---	---	---
	7-24	10-18	5.0-10.0	6.6-7.8	---	---	---	---
	24-60	27-35	15.0-20.0	7.4-9.0	5-15	---	0-2	---
Hillon-----	0-4	20-27	20.0-25.0	7.4-8.4	5-10	---	0-2	---
	4-60	20-35	15.0-20.0	7.9-9.0	5-15	---	0-2	---
372C:								
Evanston-----	0-6	20-27	15.0-20.0	6.6-7.8	---	---	---	---
	6-14	25-35	20.0-25.0	6.6-7.8	---	---	---	---
	14-25	20-35	20.0-25.0	7.4-8.4	5-15	---	0-2	---
	25-60	15-30	10.0-15.0	7.9-8.4	5-15	0-2	0-4	---
Yamacall-----	0-5	18-27	15.0-20.0	7.4-8.4	5-10	---	---	---
	5-38	18-35	10.0-15.0	7.9-9.0	10-15	0-1	0-4	1-5
	38-60	15-35	10.0-15.0	7.9-9.0	5-10	---	0-4	1-5

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
375B:								
Evanston-----	0-6	20-27	15.0-20.0	6.6-7.8	---	---	---	---
	6-12	25-35	20.0-25.0	6.6-7.8	---	---	---	---
	12-60	27-35	20.0-25.0	7.4-8.4	5-15	---	0-2	---
Lonna-----	0-7	18-27	15.0-20.0	7.4-8.4	5-10	---	0-2	---
	7-16	18-35	10.0-15.0	7.4-8.4	5-10	---	0-2	---
	16-30	18-35	10.0-15.0	7.9-9.0	5-15	---	2-4	1-13
	30-60	10-35	5.0-15.0	7.9-9.0	5-15	---	2-8	10-20
377B:								
Evanston-----	0-6	20-27	15.0-20.0	6.6-7.8	---	---	---	---
	6-14	25-35	20.0-25.0	6.6-7.8	---	---	---	---
	14-25	20-35	20.0-25.0	7.4-8.4	5-15	---	0-2	---
	25-60	15-30	10.0-15.0	7.9-8.4	5-15	0-2	0-4	---
Degrad-----	0-6	10-27	10.0-15.0	6.6-7.8	---	---	---	---
	6-11	20-35	15.0-20.0	6.6-7.8	---	---	---	---
	11-28	15-30	10.0-15.0	7.4-8.4	15-40	---	0-4	---
	28-60	0-5	1.0-5.0	7.4-8.4	8-15	---	0-2	---
381B:								
Ethridge-----	0-5	27-35	20.0-25.0	6.6-7.8	---	---	---	---
	5-12	35-45	25.0-30.0	6.6-7.8	---	---	---	---
	12-38	30-45	20.0-25.0	7.4-8.4	5-15	---	---	1-5
	38-60	27-40	20.0-25.0	7.4-8.4	5-15	1-3	2-4	1-5
385B:								
Ethridge-----	0-6	27-35	20.0-25.0	6.6-7.8	---	---	---	---
	6-14	35-45	25.0-30.0	6.6-7.8	---	---	---	---
	14-32	30-45	20.0-25.0	7.4-8.4	5-15	---	---	1-5
	32-60	27-40	20.0-25.0	7.4-8.4	5-15	1-3	2-4	1-5
Kobase-----	0-6	35-40	20.0-25.0	7.4-8.4	1-5	---	0-2	---
	6-25	35-45	20.0-25.0	7.4-8.4	2-10	---	0-2	---
	25-60	35-45	15.0-20.0	7.9-9.0	5-15	1-5	0-4	5-10
386B:								
Ethridge-----	0-6	27-35	20.0-25.0	6.6-7.8	---	---	---	---
	6-14	35-45	25.0-30.0	6.6-7.8	---	---	---	---
	14-32	30-45	20.0-25.0	7.4-8.4	5-15	---	---	1-5
	32-60	25-40	20.0-25.0	7.4-8.4	5-15	1-3	2-4	1-5
Evanston-----	0-6	20-27	15.0-20.0	6.6-7.8	---	---	---	---
	6-14	25-35	20.0-25.0	6.6-7.8	---	---	---	---
	14-25	20-35	20.0-25.0	7.4-8.4	5-15	---	0-2	---
	25-60	15-30	10.0-15.0	7.9-8.4	5-15	0-2	0-4	---
388A:								
Ethridge-----	0-6	27-35	20.0-25.0	6.6-7.8	---	---	---	---
	6-14	35-45	25.0-30.0	6.6-7.8	---	---	---	---
	14-32	30-45	20.0-25.0	7.4-8.4	5-15	---	---	1-5
	32-60	27-40	20.0-25.0	7.4-8.4	5-15	1-3	2-4	1-5
Lonna-----	0-6	27-35	15.0-20.0	7.4-8.4	5-10	---	0-2	---
	6-11	18-35	10.0-15.0	7.4-8.4	5-10	---	0-2	---
	11-34	18-35	10.0-15.0	7.9-9.0	5-15	---	2-4	1-13
	34-60	10-35	5.0-15.0	7.9-9.0	5-15	---	2-8	10-20

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
402A:								
Gerdum-----	0-7	27-40	20.0-25.0	6.6-7.8	---	---	0-2	---
	7-16	35-55	25.0-35.0	7.4-9.0	---	---	1-8	10-20
	16-60	30-50	20.0-25.0	7.9-9.0	5-15	1-5	8-16	13-30
Absher-----	0-7	40-55	25.0-30.0	7.4-9.0	---	---	4-8	1-5
	7-11	35-60	25.0-30.0	7.4-9.0	---	---	8-16	18-70
	11-60	35-50	20.0-25.0	7.9-9.0	4-15	1-5	8-30	18-70
Creed-----	0-6	20-27	15.0-20.0	6.6-8.4	---	---	0-4	---
	6-12	35-55	25.0-35.0	6.6-9.0	---	---	2-4	8-13
	12-26	27-40	20.0-30.0	7.9-9.0	5-15	---	4-8	13-20
	26-60	25-35	15.0-20.0	7.9-9.0	5-10	---	4-16	13-25
410:								
Rock outcrop----								
Fleak-----	0-3	0-10	5.0-10.0	6.6-7.8	---	---	---	---
	3-18	0-10	1.0-5.0	6.6-8.4	---	---	---	---
	18-60	---	---	---	---	---	---	---
411D:								
Farnuf-----	0-6	15-27	10.0-15.0	6.1-7.8	---	---	---	---
	6-18	25-35	15.0-20.0	6.6-7.8	---	---	---	---
	18-46	20-30	10.0-15.0	7.4-8.4	5-15	---	0-2	---
	46-60	15-30	10.0-15.0	7.4-8.4	5-10	---	2-8	5-10
Reeder-----	0-7	15-27	15.0-20.0	6.1-7.8	---	---	---	---
	7-12	18-35	15.0-25.0	6.6-7.8	---	---	---	---
	12-34	15-30	15.0-20.0	7.4-8.4	6-20	---	0-2	---
	34-60	---	---	---	---	---	---	---
411E:								
Reeder-----	0-7	15-27	15.0-20.0	6.1-7.8	---	---	---	---
	7-12	18-35	15.0-25.0	6.6-7.8	---	---	---	---
	12-34	15-30	15.0-20.0	7.4-8.4	6-20	---	0-2	---
	34-60	---	---	---	---	---	---	---
Farnuf-----	0-6	15-27	10.0-15.0	6.1-7.8	---	---	---	---
	6-18	25-35	15.0-20.0	6.6-7.8	---	---	---	---
	18-46	20-30	10.0-15.0	7.4-8.4	5-15	---	0-2	---
	46-60	15-30	10.0-15.0	7.4-8.4	5-10	---	2-8	5-10
421C:								
Joplin-----	0-6	18-27	10.0-15.0	6.6-7.8	---	---	---	---
	6-9	25-35	15.0-20.0	6.6-7.8	---	---	---	---
	9-38	18-35	10.0-15.0	7.4-8.4	5-15	---	0-2	---
	38-60	18-32	10.0-15.0	7.4-8.4	5-10	---	2-8	---
Hillon-----	0-4	20-27	20.0-25.0	7.4-8.4	5-10	---	0-2	---
	4-60	20-35	15.0-20.0	7.9-9.0	5-15	---	0-2	---
422C:								
Marmarth-----	0-7	20-27	15.0-20.0	6.6-7.3	---	---	---	---
	7-11	18-35	15.0-20.0	6.6-7.8	---	---	---	---
	11-30	15-30	10.0-15.0	7.4-8.4	5-15	---	---	---
	30-60	---	---	---	---	---	---	---

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
441C:								
Kevin-----	0-6	27-32	15.0-20.0	6.6-7.8	---	---	---	---
	6-9	35-45	20.0-25.0	6.6-8.4	---	---	---	---
	9-31	27-35	10.0-15.0	7.4-8.4	5-15	---	0-2	---
	31-60	27-35	10.0-15.0	7.9-9.0	1-10	0-2	0-2	---
Hillon-----	0-4	27-35	15.0-20.0	7.4-8.4	5-10	---	0-2	---
	4-60	20-35	15.0-20.0	7.9-9.0	5-15	---	0-2	---
442C:								
Kevin-----	0-6	27-32	15.0-20.0	6.6-7.8	---	---	---	---
	6-9	35-45	20.0-25.0	6.6-8.4	---	---	---	---
	9-31	27-35	10.0-15.0	7.4-8.4	5-15	---	0-2	---
	31-60	27-35	10.0-15.0	7.9-9.0	1-10	0-2	0-2	---
Elloam-----	0-7	27-35	20.0-25.0	6.6-7.8	---	---	0-2	---
	7-12	35-55	25.0-30.0	7.4-9.0	---	---	2-8	8-25
	12-18	30-45	20.0-25.0	7.9-9.0	5-15	---	4-8	13-25
	18-60	25-40	15.0-20.0	7.9-9.6	5-10	---	8-16	13-25
444D:								
Kevin-----	0-6	27-32	15.0-20.0	6.6-7.8	---	---	---	---
	6-9	35-45	20.0-25.0	6.6-8.4	---	---	---	---
	9-31	27-35	10.0-15.0	7.4-8.4	5-15	---	0-2	---
	31-60	27-35	10.0-15.0	7.9-9.0	1-10	0-2	0-2	---
Scobey-----	0-6	27-35	20.0-25.0	6.1-7.8	---	---	---	---
	6-15	35-45	25.0-30.0	6.6-8.4	---	---	0-2	---
	15-60	30-40	15.0-20.0	7.4-9.0	5-15	0-6	0-2	0-8
451C:								
Turner-----	0-4	15-25	10.0-20.0	6.1-7.8	---	---	---	---
	4-16	25-35	10.0-25.0	6.6-8.4	---	---	---	---
	16-34	20-35	10.0-20.0	7.4-8.4	5-15	---	---	---
	34-60	0-5	1.0-5.0	7.4-8.4	2-12	---	0-2	---
Beaverton-----	0-4	20-27	10.0-15.0	6.6-7.8	---	---	---	---
	4-15	25-35	15.0-20.0	6.6-7.8	---	---	---	---
	15-60	0-10	1.0-5.0	7.4-8.4	3-15	---	0-2	---
Beaverton-----	0-5	20-27	15.0-20.0	6.6-7.8	---	---	---	---
	5-18	25-35	15.0-20.0	6.6-7.8	---	---	---	---
	18-60	0-10	1.0-5.0	7.4-8.4	3-15	---	0-2	---
460:								
Lacey Creek-----	0-18	15-24	15.0-25.0	6.1-7.3	---	---	---	---
	18-26	24-35	15.0-25.0	6.1-7.3	---	---	---	---
	26-44	20-35	15.0-25.0	6.6-7.3	---	---	---	---
	44-60	5-20	5.0-15.0	6.6-7.3	0-2	---	---	---
471B:								
Marias-----	0-6	40-60	30.0-35.0	7.4-8.4	1-5	---	0-4	1-4
	6-38	40-60	25.0-35.0	7.9-8.4	2-10	---	0-4	1-4
	38-60	40-60	25.0-30.0	7.9-9.0	5-10	1-6	2-8	4-13
Kobase-----	0-6	35-40	20.0-25.0	7.4-8.4	1-5	---	0-2	---
	6-25	35-45	20.0-25.0	7.4-8.4	2-10	---	0-2	---
	25-60	35-45	15.0-20.0	7.9-9.0	5-15	1-5	0-4	5-10

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
481A:								
Bigsag-----	0-4	40-60	30.0-40.0	7.9-9.0	1-5	---	16	13-20
	4-15	35-60	30.0-40.0	8.5-9.0	5-15	3-5	16	20-40
	15-60	35-60	30.0-40.0	8.5-9.0	5-15	3-5	16	13-30
493A:								
Enbar-----	0-18	18-27	20.0-25.0	6.6-8.4	1-5	---	---	---
	18-30	18-30	15.0-20.0	7.9-8.4	5-10	---	---	---
	30-52	10-27	10.0-15.0	7.9-8.4	5-10	---	0-2	---
	52-60	5-18	5.0-10.0	7.9-8.4	5-10	---	0-2	---
Straw-----	0-8	20-27	20.0-25.0	6.6-8.4	0-5	---	0-2	---
	8-60	22-35	20.0-25.0	6.6-8.4	2-15	---	0-2	---
Eagleton-----	0-6	18-27	20.0-25.0	6.6-7.8	---	---	---	---
	6-38	18-35	20.0-25.0	6.6-7.8	---	---	---	---
	38-60	18-35	15.0-20.0	6.6-7.8	---	---	---	---
503B:								
Telstad-----	0-5	18-27	15.0-20.0	6.6-7.8	---	---	---	---
	5-14	25-35	20.0-25.0	6.6-8.4	---	---	---	---
	14-38	20-32	15.0-20.0	7.9-8.4	3-15	---	2-4	---
	38-60	20-32	15.0-20.0	7.9-9.0	---	0-3	2-4	---
Joplin-----	0-6	18-27	10.0-15.0	6.6-7.8	---	---	---	---
	6-9	25-35	15.0-20.0	6.6-7.8	---	---	---	---
	9-38	18-35	10.0-15.0	7.4-8.4	5-15	---	0-2	---
	38-60	18-32	10.0-15.0	7.4-8.4	5-10	---	2-8	---
503C:								
Telstad-----	0-5	18-27	15.0-20.0	6.6-7.8	---	---	---	---
	5-14	25-35	20.0-25.0	6.6-8.4	---	---	---	---
	14-38	20-32	15.0-20.0	7.9-8.4	3-15	---	2-4	---
	38-60	20-32	15.0-20.0	7.9-9.0	---	0-3	2-4	---
Joplin-----	0-6	10-27	10.0-15.0	6.6-7.8	---	---	---	---
	6-9	25-35	15.0-20.0	6.6-7.8	---	---	---	---
	9-38	18-22	10.0-15.0	7.4-8.4	5-15	---	0-2	---
	38-60	18-32	10.0-15.0	7.4-8.4	5-10	---	2-8	---
510:								
Rock outcrop----								
Belain-----	0-6	5-15	5.0-15.0	6.1-7.8	---	---	---	---
	6-13	10-18	10.0-15.0	6.6-8.4	---	---	---	---
	13-24	10-18	5.0-10.0	7.4-8.4	1-10	---	---	---
	24-60	---	---	---	---	---	---	---
511A:								
Martinsdale----	0-4	18-27	15.0-20.0	6.6-7.8	---	---	---	---
	4-18	25-35	20.0-25.0	6.6-8.4	---	---	---	---
	18-40	20-35	15.0-20.0	7.4-8.4	15-35	0-1	2-8	---
	40-60	15-30	10.0-15.0	7.4-8.4	10-20	0-1	2-8	---
Turner-----	0-4	15-25	10.0-20.0	6.6-7.8	---	---	---	---
	4-16	25-35	10.0-25.0	6.6-8.4	---	---	---	---
	16-34	20-35	10.0-20.0	7.4-8.4	5-15	---	---	---
	34-60	0-5	1.0-5.0	7.4-8.4	2-12	---	0-2	---

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
511C:								
Martinsdale-----	0-4	18-27	15.0-20.0	6.6-7.8	---	---	---	---
	4-18	25-35	20.0-25.0	6.6-8.4	---	---	---	---
	18-40	20-35	15.0-20.0	7.4-9.0	15-35	0-1	2-8	---
	40-60	15-30	10.0-15.0	7.4-9.0	10-20	0-1	2-8	---
512C:								
Martinsdale-----	0-8	18-27	10.0-25.0	6.6-7.3	---	---	---	---
	8-20	25-35	15.0-30.0	6.6-7.8	---	---	---	---
	20-42	15-35	10.0-20.0	7.4-9.0	15-35	0-1	0-2	---
	42-60	15-30	5.0-20.0	7.4-9.0	5-20	0-1	0-2	---
521B:								
Thoeny-----	0-6	15-27	15.0-20.0	5.6-7.8	---	---	0-4	---
	6-14	35-50	25.0-30.0	7.4-9.0	---	---	4-8	5-20
	14-34	35-50	25.0-30.0	7.9-9.0	5-10	---	4-8	13-25
	34-60	27-40	15.0-20.0	7.9-9.0	1-5	1-3	4-16	13-25
Elloam-----	0-7	27-35	20.0-25.0	6.6-7.8	---	---	0-2	---
	7-12	35-55	25.0-30.0	7.4-9.0	---	---	2-8	8-25
	12-18	30-45	20.0-25.0	7.9-9.0	5-15	---	4-8	13-25
	18-60	25-40	15.0-20.0	7.9-9.6	5-10	---	8-16	13-25
Absher-----	0-7	40-55	25.0-30.0	7.4-9.0	---	---	4-8	1-5
	7-11	35-60	25.0-30.0	7.4-9.0	---	---	8-16	18-70
	11-60	35-50	20.0-25.0	7.9-9.0	4-15	1-5	8-30	18-70
530F:								
Warwood-----	0-4	20-27	10.0-20.0	5.6-6.5	---	---	---	---
	4-8	15-27	5.0-15.0	5.6-6.5	---	---	---	---
	8-15	20-35	10.0-20.0	5.6-6.5	---	---	---	---
	15-24	27-35	10.0-20.0	6.1-7.3	---	---	---	---
	24-60	20-35	10.0-20.0	6.1-7.3	---	---	---	---
531A:								
Sweetgrass-----	0-6	27-35	25.0-30.0	6.6-7.8	---	---	---	---
	6-18	35-50	30.0-35.0	6.6-7.8	---	---	---	---
	18-25	10-30	20.0-25.0	7.4-8.4	15-50	---	0-2	---
	25-60	5-15	1.0-5.0	7.4-8.4	10-20	---	0-2	---
Beaverton-----	0-4	20-27	10.0-15.0	6.6-7.8	---	---	---	---
	4-15	25-35	15.0-20.0	6.6-7.8	---	---	---	---
	15-60	0-10	1.0-5.0	7.4-8.4	3-15	---	0-2	---
531C:								
Sweetgrass-----	0-6	27-35	25.0-30.0	6.6-7.8	---	---	---	---
	6-18	35-50	30.0-35.0	6.6-7.8	---	---	---	---
	18-25	10-30	20.0-25.0	7.4-8.4	15-50	---	0-2	---
	25-60	0-10	1.0-5.0	7.4-8.4	10-20	---	0-2	---
Beaverton-----	0-4	20-27	10.0-15.0	6.6-7.8	---	---	---	---
	4-15	25-35	15.0-20.0	6.6-7.8	---	---	---	---
	15-60	0-10	1.0-5.0	7.4-8.4	3-15	---	0-2	---
Beaverton-----	0-5	20-27	15.0-20.0	6.6-7.8	---	---	---	---
	5-18	25-35	15.0-20.0	6.6-7.8	---	---	---	---
	18-60	0-10	1.0-5.0	7.4-8.4	3-15	---	0-2	---

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
550F:								
Libeg-----	0-8	15-27	10.0-20.0	6.1-7.3	---	---	---	---
	8-14	15-35	10.0-20.0	6.1-7.3	---	---	---	---
	14-48	20-35	10.0-20.0	6.1-7.3	---	---	---	---
	48-60	10-20	5.0-10.0	5.6-7.3	---	---	---	---
Arrowpeak-----	0-8	10-20	10.0-25.0	6.1-7.3	---	---	---	---
	8-17	10-20	10.0-20.0	6.1-7.3	---	---	---	---
	17-60	---	---	---	---	---	---	---
Elkner-----	0-5	5-10	10.0-15.0	5.6-6.5	---	---	---	---
	5-32	5-10	5.0-10.0	5.6-6.5	---	---	---	---
	32-60	0-5	5.0-10.0	5.6-7.3	---	---	---	---
551B:								
Lonesome-----	0-6	5-15	5.0-10.0	6.6-7.8	---	---	---	---
	6-32	5-15	5.0-10.0	6.6-7.8	---	---	---	---
	32-60	20-35	10.0-20.0	7.9-9.0	5-15	---	0-4	0-13
560F:								
Elve-----	0-18	10-20	10.0-15.0	5.1-6.5	---	---	---	---
	18-60	10-20	5.0-10.0	5.1-6.5	---	---	---	---
Rock outcrop----								
561B:								
Scobey-----	0-6	27-35	20.0-25.0	6.1-7.8	---	---	---	---
	6-15	35-45	25.0-30.0	6.6-8.4	---	---	0-2	---
	15-60	30-40	15.0-20.0	7.4-9.0	5-15	0-6	0-2	0-8
Kevin-----	0-6	27-32	15.0-20.0	6.6-7.8	---	---	---	---
	6-9	35-45	20.0-25.0	6.6-8.4	---	---	---	---
	9-31	27-35	10.0-15.0	7.4-8.4	5-15	---	0-2	---
	31-60	27-35	10.0-15.0	7.9-8.4	1-10	0-2	0-2	---
561C:								
Scobey-----	0-6	27-35	20.0-25.0	6.1-7.8	---	---	---	---
	6-15	35-45	25.0-30.0	6.6-8.4	---	---	0-2	---
	15-60	30-40	15.0-20.0	7.4-9.0	5-15	0-6	0-2	0-8
Kevin-----	0-6	27-32	15.0-20.0	6.6-7.8	---	---	---	---
	6-9	35-45	20.0-25.0	6.6-8.4	---	---	---	---
	9-31	27-35	10.0-15.0	7.4-8.4	5-15	---	0-2	---
	31-60	27-35	10.0-15.0	7.9-8.4	1-10	0-2	0-2	---
562B:								
Scobey-----	0-6	27-35	20.0-25.0	6.1-7.8	---	---	---	---
	6-15	35-45	25.0-30.0	6.6-8.4	---	---	0-2	---
	15-60	30-40	15.0-20.0	7.4-9.0	5-15	0-6	0-2	0-8
Linnet-----	0-7	40-45	20.0-30.0	6.1-7.3	---	---	---	---
	7-14	45-60	20.0-30.0	6.6-7.8	---	---	---	---
	14-36	35-50	20.0-25.0	7.4-8.4	5-15	---	---	2-13
	36-60	35-50	20.0-25.0	7.9-9.0	1-5	1-5	0-4	---
563A:								
Fortbenton-----	0-7	10-18	10.0-15.0	6.6-7.8	---	---	---	---
	7-24	10-18	5.0-10.0	6.6-7.8	---	---	---	---
	24-60	27-35	15.0-20.0	7.4-9.0	5-15	---	0-2	---

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
563A: (cont.)								
Scobey-----	0-7	10-20	10.0-15.0	6.1-7.8	---	---	---	---
	7-15	35-45	25.0-30.0	6.6-8.4	---	---	0-2	---
	15-60	30-40	15.0-20.0	7.4-9.0	5-15	0-6	0-2	0-8
580F:								
Garlet-----	0-12	10-25	15.0-20.0	5.6-6.5	---	---	---	---
	12-26	10-25	10.0-15.0	5.6-6.5	---	---	---	---
	26-44	10-25	10.0-15.0	5.6-7.3	---	---	---	---
	44-60	10-25	10.0-15.0	6.1-7.3	5-10	---	---	---
Elkner-----	0-5	5-10	10.0-15.0	5.6-6.5	---	---	---	---
	5-32	5-10	5.0-10.0	5.6-6.5	---	---	---	---
	32-60	0-5	5.0-10.0	5.6-7.3	---	---	---	---
601A:								
Havre-----	0-6	20-27	15.0-20.0	6.6-7.8	1-5	---	0-2	---
	6-60	18-35	15.0-25.0	7.4-8.4	1-5	---	0-4	---
Glendive-----	0-6	5-15	10.0-15.0	6.6-8.4	---	---	0-4	---
	6-29	5-18	10.0-15.0	7.4-9.0	1-5	---	0-4	---
	29-60	5-18	10.0-15.0	7.4-9.0	1-10	---	2-8	---
602A:								
Havre-----	0-10	27-35	20.0-25.0	6.6-7.8	1-5	---	0-2	---
	10-60	18-35	15.0-25.0	7.4-8.4	1-5	---	0-4	---
603A:								
Havre-----	0-6	20-27	15.0-20.0	6.6-7.8	1-5	---	0-2	---
	6-60	18-35	15.0-25.0	7.4-8.4	1-5	---	0-4	---
Glendive-----	0-6	5-15	10.0-15.0	6.6-8.4	---	---	0-4	---
	6-29	5-18	10.0-15.0	7.4-9.0	1-5	---	0-4	---
	29-60	5-18	10.0-15.0	7.4-9.0	1-10	---	0-4	---
605C:								
Yamacall-----	0-4	18-27	15.0-20.0	6.6-8.4	---	---	---	---
	4-12	18-35	10.0-15.0	6.6-8.4	---	---	---	---
	12-60	18-35	10.0-15.0	7.9-8.4	5-15	0-1	0-4	1-5
Havre-----	0-6	20-27	15.0-20.0	6.6-7.8	1-5	---	0-2	---
	6-60	18-35	15.0-25.0	7.4-8.4	1-5	---	0-4	---
621E:								
Sagedale-----	0-4	35-40	20.0-25.0	7.4-8.4	---	---	---	---
	4-15	32-45	20.0-25.0	7.4-8.4	---	---	0-2	---
	15-30	35-45	20.0-25.0	7.4-8.4	5-15	---	0-4	---
	30-60	35-45	20.0-25.0	7.4-9.0	5-10	1-7	0-4	---
Wayden-----	0-3	35-40	15.0-30.0	7.4-8.4	---	---	0-4	---
	3-18	35-50	15.0-30.0	7.4-8.4	---	---	0-8	---
	18-60	---	---	---	---	---	---	---
621F:								
Wayden-----	0-3	35-40	15.0-30.0	7.4-8.4	---	---	0-4	---
	3-18	35-50	15.0-30.0	7.4-8.4	---	---	0-8	---
	18-60	---	---	---	---	---	---	---

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
621F: (cont.)								
Sagedale-----	0-4	30-40	20.0-25.0	7.4-8.4	---	---	---	---
	4-15	32-45	20.0-25.0	7.4-8.4	---	---	0-2	---
	15-30	35-45	20.0-25.0	7.4-8.4	5-15	---	0-4	---
	30-60	35-45	20.0-25.0	7.4-9.0	5-10	1-7	0-4	---
623F:								
Linwell-----	0-11	30-40	30.0-35.0	6.6-7.8	---	---	---	---
	11-24	35-45	30.0-35.0	7.4-8.4	1-15	---	---	---
	24-60	35-45	25.0-30.0	7.4-8.4	5-12	---	0-2	---
Winifred-----	0-4	27-40	25.0-30.0	6.6-7.8	---	---	---	---
	4-15	35-50	30.0-35.0	7.4-8.4	1-5	---	0-2	---
	15-34	35-50	30.0-35.0	7.4-9.0	5-15	1-5	0-4	1-5
	34-60	---	---	---	---	---	---	---
630E:								
Crow-----	0-4	20-27	10.0-15.0	5.6-6.5	---	---	---	---
	4-17	20-40	10.0-20.0	5.6-7.3	---	---	---	---
	17-45	35-60	15.0-20.0	6.1-7.3	---	---	---	---
	45-60	20-35	10.0-15.0	6.1-7.3	---	---	---	---
Lubrecht-----	0-4	20-27	15.0-20.0	5.1-7.3	---	---	---	---
	4-12	27-40	15.0-20.0	5.6-7.3	---	---	---	---
	12-33	40-60	20.0-25.0	5.6-7.3	---	---	---	---
	33-60	---	---	---	---	---	---	---
641F:								
Norbert-----	0-5	45-60	35.0-40.0	7.4-8.4	---	---	0-4	---
	5-18	50-60	30.0-35.0	7.4-8.4	2-15	1-3	2-4	---
	18-60	---	---	---	---	---	---	---
Barkof-----	0-4	40-50	30.0-40.0	7.4-8.4	1-5	---	0-2	---
	4-24	45-60	30.0-35.0	7.9-9.0	5-10	---	0-4	1-5
	24-60	---	---	---	---	---	---	---
650D:								
Laceycreek-----	0-9	15-24	15.0-25.0	6.1-7.3	---	---	---	---
	9-22	24-35	15.0-25.0	6.1-7.3	---	---	---	---
	22-52	20-35	15.0-25.0	6.6-7.3	---	---	---	---
	52-60	5-20	5.0-15.0	6.6-7.3	0-2	---	---	---
Ambrant-----	0-4	5-15	15.0-25.0	5.6-7.3	---	---	---	---
	4-21	5-15	5.0-15.0	5.6-7.3	---	---	---	---
	21-43	5-18	5.0-10.0	5.6-7.3	---	---	---	---
	43-60	0-5	1.0-5.0	5.6-7.3	---	---	---	---
650F:								
Laceycreek-----	0-9	15-24	15.0-25.0	6.1-7.3	---	---	---	---
	9-22	24-35	15.0-25.0	6.1-7.3	---	---	---	---
	22-52	20-35	15.0-25.0	6.6-7.3	---	---	---	---
	52-60	5-20	5.0-15.0	6.6-7.3	0-2	---	---	---
Eaglecreek-----	0-4	12-22	10.0-15.0	6.1-6.5	---	---	---	---
	4-10	10-18	10.0-15.0	6.1-6.5	---	---	---	---
	10-32	18-35	10.0-15.0	6.1-7.3	---	---	---	---
	32-60	---	---	---	---	---	---	---

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
653F:								
Fleak-----	0-3	0-10	5.0-10.0	6.6-7.8	---	---	---	---
	3-18	0-10	1.0-5.0	6.6-8.4	---	---	---	---
	18-60	---	---	---	---	---	---	---
Twilight-----	0-5	5-18	10.0-15.0	6.6-7.8	---	---	---	---
	5-15	5-18	5.0-10.0	6.6-7.8	---	---	---	---
	15-30	5-18	5.0-10.0	7.4-8.4	5-10	---	0-4	---
	30-60	---	---	---	---	---	---	---
Yetull-----	0-8	0-10	5.0-10.0	6.6-7.8	---	---	---	---
	8-60	0-10	1.0-5.0	7.4-8.4	1-5	---	0-4	---
654F:								
Fleak-----	0-3	0-10	5.0-10.0	6.6-7.8	---	---	---	---
	3-18	0-10	1.0-5.0	6.6-8.4	---	---	---	---
	18-60	---	---	---	---	---	---	---
Twilight-----	0-5	5-18	10.0-15.0	6.6-7.8	---	---	---	---
	5-15	5-18	5.0-10.0	6.6-7.8	---	---	---	---
	15-30	5-18	5.0-10.0	7.4-8.4	5-10	---	0-4	---
	30-60	---	---	---	---	---	---	---
Rock outcrop----								
661E:								
Twilight-----	0-5	5-18	10.0-15.0	6.6-7.8	---	---	---	---
	5-15	5-18	5.0-10.0	6.6-7.8	---	---	---	---
	15-30	5-18	5.0-10.0	7.4-8.4	5-10	---	0-4	---
	30-60	---	---	---	---	---	---	---
Fleak-----	0-3	0-10	5.0-10.0	6.6-7.8	---	---	---	---
	3-18	0-10	1.0-5.0	6.6-8.4	---	---	---	---
	18-60	---	---	---	---	---	---	---
671B:								
Bearpaw-----	0-6	27-35	20.0-25.0	6.1-7.8	---	---	---	---
	6-16	35-50	25.0-30.0	6.6-7.8	---	---	---	---
	16-34	35-45	20.0-25.0	7.4-8.4	5-15	---	2-4	1-5
	34-60	30-45	20.0-25.0	7.4-8.4	5-10	0-2	2-8	5-8
Vida-----	0-5	27-30	15.0-20.0	6.6-7.8	---	---	0-2	---
	5-15	25-35	15.0-20.0	6.6-8.4	---	---	0-2	---
	15-60	25-35	15.0-20.0	7.9-8.4	5-15	---	0-2	---
671C:								
Bearpaw-----	0-6	27-35	20.0-25.0	6.1-7.8	---	---	---	---
	6-16	35-50	25.0-30.0	6.6-7.8	---	---	---	---
	16-34	35-45	20.0-25.0	7.4-8.4	5-15	---	2-4	1-5
	34-60	30-45	20.0-25.0	7.4-8.4	5-10	0-2	2-8	5-8
Vida-----	0-5	27-30	15.0-20.0	6.6-7.8	---	---	0-2	---
	5-15	25-35	15.0-20.0	6.6-7.8	---	---	0-2	---
	15-60	25-35	15.0-20.0	7.9-8.4	2-15	0-5	0-2	---

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
673A:								
Bearpaw-----	0-6	27-35	20.0-25.0	6.1-7.8	---	---	---	---
	6-16	35-50	25.0-30.0	6.6-7.8	---	---	---	---
	16-34	35-45	20.0-25.0	7.4-8.4	5-15	---	2-4	1-5
	34-60	30-45	20.0-25.0	7.4-9.0	5-10	0-2	2-8	5-8
Daglum-----	0-12	20-27	15.0-25.0	6.1-7.8	---	---	---	---
	12-20	35-60	20.0-40.0	6.6-9.0	0-5	---	2-8	8-20
	20-60	35-60	20.0-35.0	7.9-9.0	5-15	2-5	8-16	13-30
674B:								
Bearpaw-----	0-6	27-35	20.0-25.0	6.1-7.8	---	---	---	---
	6-16	35-50	25.0-30.0	6.6-7.8	---	---	---	---
	16-34	35-45	20.0-25.0	7.4-8.4	5-15	---	2-4	1-5
	34-60	30-45	20.0-25.0	7.4-9.0	5-10	0-2	2-8	5-8
Waltham-----	0-6	35-40	15.0-20.0	7.4-8.4	---	---	0-2	0-4
	6-11	45-60	30.0-40.0	7.4-8.4	---	---	0-2	4-13
	11-18	35-45	20.0-25.0	7.9-9.0	5-15	---	0-4	13-25
	18-60	27-40	15.0-20.0	7.4-9.0	5-15	3-5	4-16	4-20
680F:								
Winkler-----	0-10	5-15	10.0-15.0	6.1-7.3	---	---	---	---
	10-18	5-15	5.0-10.0	5.6-7.3	---	---	---	---
	18-36	5-15	5.0-10.0	5.6-7.3	---	---	---	---
	36-60	5-15	5.0-10.0	5.6-7.3	---	---	---	---
Ambrant-----	0-4	5-15	15.0-25.0	5.6-7.3	---	---	---	---
	4-21	5-15	5.0-15.0	5.6-7.3	---	---	---	---
	21-43	5-18	5.0-10.0	5.6-7.3	---	---	---	---
	43-60	0-5	1.0-5.0	5.6-7.3	---	---	---	---
Winkler-----	0-10	5-15	10.0-15.0	6.1-7.3	---	---	---	---
	10-18	5-15	5.0-10.0	5.6-7.3	---	---	---	---
	18-36	5-15	5.0-10.0	5.6-7.3	---	---	---	---
	36-60	5-15	5.0-10.0	5.6-7.3	---	---	---	---
681C:								
Gerber-----	0-6	40-50	25.0-30.0	6.6-7.8	---	---	---	---
	6-14	45-60	25.0-30.0	7.4-8.4	---	---	0-2	---
	14-30	35-50	20.0-25.0	7.4-8.4	5-15	---	2-4	---
	30-60	35-50	20.0-25.0	7.4-8.4	5-10	---	2-4	---
691D:								
Vida-----	0-5	20-27	10.0-15.0	6.6-7.8	---	---	0-2	---
	5-34	25-35	15.0-20.0	6.6-7.8	---	---	0-2	---
	34-60	25-35	15.0-20.0	7.9-8.4	2-15	0-5	0-2	---
Williams-----	0-5	15-27	15.0-20.0	6.6-7.3	---	---	---	---
	5-16	25-35	15.0-20.0	6.6-7.8	---	---	---	---
	16-60	22-35	15.0-20.0	7.4-8.4	5-15	---	---	---
692D:								
Vida-----	0-5	27-30	15.0-20.0	6.6-7.8	---	---	0-2	---
	5-15	27-35	15.0-20.0	6.6-7.8	---	---	0-2	---
	15-60	27-35	15.0-20.0	7.9-8.4	2-15	0-5	0-2	---

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
792D: (cont.)								
Bearpaw-----	0-6	27-35	20.0-25.0	6.1-7.8	---	---	---	---
	6-16	35-50	25.0-30.0	6.6-7.8	---	---	---	---
	16-34	35-45	20.0-25.0	7.4-8.4	5-15	---	2-4	1-5
	34-60	30-45	20.0-25.0	7.4-9.0	5-10	0-2	2-8	5-8
693C:								
Vida-----	0-5	27-30	15.0-20.0	6.6-7.8	---	---	0-2	---
	5-15	27-35	15.0-20.0	6.6-7.8	---	---	0-2	---
	15-60	27-35	15.0-20.0	7.9-8.4	2-15	0-5	0-2	---
Bearpaw-----	0-6	27-35	20.0-25.0	6.1-7.8	---	---	---	---
	6-16	35-50	25.0-30.0	6.6-7.8	---	---	---	---
	16-34	35-45	20.0-25.0	7.4-8.4	5-15	---	2-4	1-5
	34-60	30-45	20.0-25.0	7.4-9.0	5-10	0-2	2-8	5-8
Nishon-----	0-8	27-35	15.0-20.0	6.1-7.8	---	---	---	---
	8-31	40-60	30.0-35.0	6.6-8.4	---	---	0-2	---
	31-60	35-55	30.0-35.0	7.4-9.0	5-15	---	2-4	---
701E:								
Work-----	0-6	27-35	20.0-25.0	6.1-7.3	---	---	---	---
	6-22	35-50	20.0-25.0	6.6-7.8	---	---	---	---
	22-48	20-40	15.0-20.0	7.4-8.4	3-15	---	0-4	---
	48-60	15-40	10.0-15.0	7.4-8.4	5-15	---	0-4	---
Absarokee-----	0-7	27-35	25.0-30.0	6.1-7.3	---	---	0-2	---
	7-18	35-50	25.0-35.0	6.6-7.8	---	---	0-2	---
	18-34	30-40	15.0-20.0	7.4-8.4	5-15	---	0-2	---
	34-60	---	---	---	---	---	---	---
702E:								
Work-----	0-6	20-27	20.0-25.0	6.1-7.3	---	---	---	---
	6-22	35-50	30.0-35.0	6.6-7.8	---	---	---	---
	22-48	20-40	15.0-25.0	7.4-8.4	3-15	---	0-4	---
	48-60	15-40	10.0-20.0	7.4-8.4	5-15	---	0-4	---
Absarokee-----	0-7	20-27	20.0-25.0	6.1-7.3	---	---	---	---
	7-18	35-50	25.0-35.0	6.6-7.8	---	---	0-2	---
	18-34	30-40	15.0-20.0	7.4-8.4	5-15	---	0-2	---
	34-60	---	---	---	---	---	---	---
721E:								
Zahill-----	0-3	27-35	20.0-25.0	7.4-8.4	5-10	---	0-2	---
	3-18	20-35	15.0-20.0	7.4-8.4	8-15	---	0-2	---
	18-60	20-35	15.0-20.0	7.4-9.0	2-12	1-5	0-2	---
Vida-----	0-5	27-30	15.0-20.0	6.6-7.8	---	---	0-2	---
	5-15	25-35	15.0-20.0	6.6-7.8	---	---	0-2	---
	15-60	25-35	15.0-20.0	7.9-8.4	2-15	0-5	0-2	---
722F:								
Zahill-----	0-3	27-35	20.0-25.0	7.4-8.4	5-10	---	0-2	---
	3-18	20-35	15.0-20.0	7.4-8.4	8-15	---	0-2	---
	18-60	20-35	15.0-20.0	7.4-9.0	2-12	1-5	0-2	---
Sagedale-----	0-4	35-40	20.0-25.0	7.4-8.4	---	---	---	---
	4-15	32-45	20.0-25.0	7.4-8.4	---	---	0-2	---
	15-30	35-45	20.0-25.0	7.4-8.4	5-15	---	0-4	---
	30-60	35-45	20.0-25.0	7.4-9.0	5-10	1-7	0-4	---

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
722F: (cont.)								
Wayden-----	0-3	35-40	15.0-30.0	7.4-8.4	---	---	0-4	---
	3-18	35-50	15.0-30.0	7.4-8.4	---	---	0-8	---
	18-60	---	---	---	---	---	---	---
723F:								
Zahill-----	0-3	27-35	20.0-25.0	7.4-8.4	5-10	---	0-2	---
	3-18	20-35	15.0-20.0	7.4-8.4	8-15	---	0-2	---
	18-60	20-35	15.0-20.0	7.4-9.0	2-12	1-5	0-2	---
Cabba-----	0-3	20-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	3-15	20-35	5.0-10.0	7.4-9.0	5-15	---	2-8	---
	15-60	---	---	---	---	---	---	---
731F:								
Yetull-----	0-5	0-10	5.0-10.0	7.4-8.4	---	---	---	---
	5-60	0-10	1.0-5.0	7.4-8.4	1-5	---	0-4	---
Dune land-----								
741B:								
Shambo-----	0-6	18-27	15.0-20.0	6.6-7.8	---	---	---	---
	6-15	18-35	10.0-15.0	6.6-8.4	---	---	---	---
	15-60	18-35	10.0-15.0	7.4-9.0	5-20	---	---	1-5
Straw-----	0-8	10-27	15.0-25.0	6.6-8.4	---	---	---	---
	8-42	18-32	15.0-25.0	6.6-8.4	3-15	---	---	---
	42-60	5-20	10.0-15.0	7.4-8.4	2-12	---	0-2	---
745F:								
Shambo-----	0-6	20-27	15.0-20.0	6.6-7.8	---	---	---	---
	6-15	18-35	10.0-15.0	6.6-8.4	---	---	---	---
	15-60	18-35	10.0-15.0	7.4-9.0	5-20	---	---	1-5
Amor-----	0-5	15-27	15.0-20.0	6.6-7.3	---	---	---	---
	5-34	18-35	10.0-15.0	6.6-8.4	2-10	---	---	---
	34-60	---	---	---	---	---	---	---
Cabba-----	0-3	20-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	3-15	20-35	5.0-10.0	7.4-9.0	5-15	---	2-8	---
	15-60	---	---	---	---	---	---	---
761C:								
Hedoes-----	0-5	10-15	15.0-20.0	6.6-7.3	---	---	---	---
	5-20	10-18	15.0-20.0	6.6-8.4	---	---	---	---
	20-31	5-18	5.0-10.0	6.6-8.4	---	---	0-4	---
	31-60	0-10	1.0-5.0	7.4-8.4	5-10	---	0-4	---
Belain-----	0-6	15-20	15.0-20.0	6.1-7.8	---	---	---	---
	6-18	10-18	10.0-15.0	6.6-8.4	---	---	---	---
	18-26	10-18	5.0-10.0	7.4-8.4	1-10	---	---	---
	26-60	---	---	---	---	---	---	---
761E:								
Hedoes-----	0-5	10-15	15.0-20.0	6.6-7.3	---	---	---	---
	5-20	5-15	15.0-20.0	6.6-8.4	---	---	---	---
	20-31	0-10	5.0-10.0	7.4-8.4	---	---	0-4	---
	31-60	0-10	1.0-5.0	7.4-8.4	5-10	---	0-4	---

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
761E (cont.):								
Belain-----	0-6	15-20	15.0-20.0	6.1-7.8	---	---	---	---
	6-18	10-18	10.0-15.0	6.6-8.4	---	---	---	---
	18-26	10-18	5.0-10.0	7.4-8.4	1-10	---	---	---
	26-60	---	---	---	---	---	---	---
793B:								
Yamacall-----	0-5	27-35	15.0-20.0	7.4-8.4	5-10	---	---	---
	5-38	18-35	10.0-15.0	7.9-9.0	10-15	0-1	0-4	1-5
	38-60	15-35	10.0-15.0	7.9-9.0	5-10	---	0-4	1-5
793C:								
Yamacall-----	0-5	27-35	15.0-20.0	7.4-8.4	5-10	---	---	---
	5-38	18-35	10.0-15.0	7.9-9.0	10-15	0-1	0-4	1-5
	38-60	15-35	10.0-15.0	7.9-9.0	5-10	---	0-4	1-5
795C:								
Yamacall-----	0-5	27-35	15.0-20.0	7.4-8.4	5-10	---	---	---
	5-38	18-35	10.0-15.0	7.9-9.0	10-15	0-1	0-4	1-5
	38-60	15-35	10.0-15.0	7.9-9.0	5-10	---	0-4	1-5
Benz-----	0-7	27-35	10.0-25.0	7.4-9.0	5-10	---	4-8	4-13
	7-60	18-35	10.0-20.0	8.5-9.6	5-15	2-5	8-16	13-30
795D:								
Yamacall-----	0-5	27-35	15.0-20.0	7.4-8.4	5-10	---	---	---
	5-38	18-35	10.0-15.0	7.9-9.0	10-15	0-1	0-4	1-5
	38-60	15-35	10.0-15.0	7.9-9.0	5-10	---	0-4	1-5
Benz-----	0-7	27-35	10.0-25.0	7.4-9.0	5-10	---	4-8	4-13
	7-60	18-35	10.0-20.0	8.5-9.6	5-15	2-5	8-16	13-30
801B:								
Williams-----	0-5	15-27	15.0-20.0	6.6-7.3	---	---	---	---
	5-16	25-35	15.0-20.0	6.6-7.8	---	---	---	---
	16-60	22-35	15.0-20.0	7.4-8.4	5-15	---	---	---
Vida-----	0-5	20-27	10.0-15.0	6.6-7.8	---	---	0-2	---
	5-34	25-35	15.0-20.0	6.6-7.8	---	---	0-2	---
	34-60	25-35	15.0-20.0	7.9-8.4	2-15	0-5	0-2	---
801C:								
Williams-----	0-5	15-27	15.0-20.0	6.6-7.3	---	---	---	---
	5-16	25-35	15.0-20.0	6.6-7.8	---	---	---	---
	16-60	22-35	15.0-20.0	7.4-8.4	5-15	---	---	---
Vida-----	0-5	20-27	10.0-15.0	6.6-7.8	---	---	0-2	---
	5-34	25-35	15.0-20.0	6.6-7.8	---	---	0-2	---
	34-60	25-35	15.0-20.0	7.9-8.4	2-15	0-5	0-2	---
828A:								
Savage-----	0-6	20-27	20.0-25.0	6.1-7.8	---	---	---	---
	6-28	35-50	30.0-35.0	6.1-8.4	---	---	0-4	---
	28-60	30-45	25.0-30.0	7.4-8.4	5-15	---	0-4	---
842A:								
Savage-----	0-6	27-35	25.0-30.0	6.1-7.8	---	---	0-4	---
	6-22	35-50	30.0-35.0	6.1-8.4	---	---	0-4	---
	22-36	30-45	25.0-30.0	7.4-8.4	5-15	0-2	4-8	---
	36-60	30-45	25.0-30.0	7.9-9.0	5-15	1-3	4-16	---

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
842A: (cont.)								
Daglum-----	0-9	18-27	15.0-20.0	6.1-7.3	---	---	0-2	---
	9-16	35-60	25.0-35.0	7.4-9.0	---	---	2-8	8-20
	16-60	35-60	25.0-35.0	7.9-9.0	5-15	2-5	8-16	13-30
863E:								
Work-----	0-6	20-27	20.0-25.0	6.1-7.3	---	---	---	---
	6-22	35-50	30.0-35.0	6.6-7.8	---	---	---	---
	22-48	20-40	15.0-25.0	7.4-8.4	3-15	---	0-4	---
	48-60	15-40	10.0-20.0	7.4-8.4	5-15	---	0-4	---
Roy-----	0-7	15-27	15.0-20.0	6.1-7.8	---	---	---	---
	7-15	35-50	25.0-30.0	6.6-7.8	---	---	0-2	---
	15-60	27-40	20.0-25.0	7.4-8.4	---	---	0-4	---
871B:								
Tamaneen-----	0-6	27-35	25.0-30.0	6.6-7.8	---	---	---	---
	6-15	35-50	25.0-30.0	6.6-7.8	---	---	0-2	---
	15-19	30-45	20.0-25.0	7.4-8.4	20-30	---	0-2	---
	19-30	18-35	5.0-10.0	7.9-8.4	20-30	---	0-2	---
	30-60	8-25	2.0- 5.0	7.9-8.4	25-40	---	0-2	---
871C:								
Tamaneen-----	0-6	27-35	25.0-30.0	6.6-7.8	---	---	---	---
	6-15	35-50	25.0-30.0	6.6-7.8	---	---	0-2	---
	15-19	30-45	20.0-25.0	7.4-8.4	20-30	---	0-2	---
	19-30	18-35	2.0- 5.0	7.9-8.4	20-30	---	0-2	---
	30-60	8-25	---	7.9-8.4	25-40	---	0-2	---
883F:								
Perma-----	0-7	7-20	10.0-20.0	6.6-7.3	---	---	---	---
	7-28	7-27	10.0-15.0	6.6-7.8	---	---	---	---
	28-60	0-15	1.0-5.0	6.6-7.8	---	---	---	---
Whitlash-----	0-6	10-27	10.0-25.0	6.1-7.3	---	---	---	---
	6-15	10-27	10.0-25.0	6.1-7.3	---	---	---	---
	15-60	---	---	---	---	---	---	---
892F:								
Whitlash-----	0-6	10-27	10.0-25.0	6.1-7.3	---	---	---	---
	6-15	10-27	10.0-25.0	6.1-7.3	---	---	---	---
	15-60	---	---	---	---	---	---	---
Belain-----	0-6	15-20	15.0-20.0	6.1-7.8	---	---	---	---
	6-18	10-18	10.0-15.0	6.6-8.4	---	---	---	---
	18-26	10-18	5.0-10.0	7.4-8.4	1-10	---	---	---
	26-60	---	---	---	---	---	---	---
Rock outcrop----								
895F:								
Belain-----	0-6	15-20	15.0-20.0	6.1-7.8	---	---	---	---
	6-18	10-18	10.0-15.0	6.6-8.4	---	---	---	---
	18-26	10-18	5.0-10.0	7.4-8.4	1-10	---	---	---
	26-60	---	---	---	---	---	---	---
Whitlash-----	0-6	10-27	10.0-25.0	6.1-7.3	---	---	---	---
	6-15	10-27	10.0-25.0	6.1-7.3	---	---	---	---
	15-60	---	---	---	---	---	---	---

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
895F: (cont.)								
Hedoes-----	0-5	10-15	15.0-20.0	6.6-7.3	---	---	---	---
	5-20	10-18	15.0-20.0	6.6-8.4	---	---	---	---
	20-31	5-18	5.0-10.0	6.6-8.4	---	---	0-4	---
	31-60	0-10	1.0-5.0	7.4-8.4	5-10	---	0-4	---
896E:								
Belain-----	0-6	15-20	15.0-20.0	6.1-7.8	---	---	---	---
	6-18	10-18	10.0-15.0	6.6-8.4	---	---	---	---
	18-26	10-18	5.0-10.0	7.4-8.4	1-10	---	---	---
	26-60	---	---	---	---	---	---	---
Whitlash-----	0-6	10-27	10.0-25.0	6.1-7.3	---	---	---	---
	6-15	10-27	10.0-25.0	6.1-7.3	---	---	---	---
	15-60	---	---	---	---	---	---	---
Rock outcrop----								
911F:								
Belain-----	0-6	15-20	15.0-20.0	6.1-7.8	---	---	---	---
	6-18	10-18	10.0-15.0	6.6-8.4	---	---	---	---
	18-26	10-18	5.0-10.0	7.4-8.4	1-10	---	---	---
	26-60	---	---	---	---	---	---	---
Whitlash-----	0-6	10-27	10.0-25.0	6.1-7.3	---	---	---	---
	6-15	10-27	10.0-25.0	6.1-7.3	---	---	---	---
	15-60	---	---	---	---	---	---	---
Hedoes-----	0-5	10-15	15.0-20.0	6.6-7.3	---	---	---	---
	5-20	10-18	15.0-20.0	6.6-8.4	---	---	---	---
	20-31	5-18	5.0-10.0	6.6-8.4	---	---	0-4	---
	31-60	0-10	1.0-5.0	7.4-8.4	5-10	---	0-4	---
916C:								
Belain-----	0-5	5-15	5.0-15.0	6.1-7.8	---	---	---	---
	5-20	10-18	10.0-15.0	6.6-8.4	---	---	---	---
	20-24	10-18	5.0-10.0	7.4-8.4	1-10	---	0-2	---
	24-60	---	---	---	---	---	---	---
Hedoes-----	0-8	5-15	10.0-15.0	6.6-7.3	---	---	---	---
	8-18	5-18	15.0-20.0	6.6-8.4	---	---	---	---
	18-60	0-10	5.0-10.0	7.4-8.4	---	---	0-4	---
925F:								
Sunburst-----	0-5	35-40	20.0-25.0	7.4-8.4	5-10	---	0-2	---
	5-20	35-50	20.0-25.0	7.9-8.4	5-15	---	2-4	---
	20-60	35-50	20.0-25.0	7.9-9.0	5-15	1-3	2-8	---
Lambeth-----	0-4	20-27	15.0-20.0	6.6-8.4	5-10	---	---	---
	4-60	20-35	15.0-20.0	7.9-9.0	10-15	1-5	0-4	1-5
941D:								
Busby-----	0-4	10-18	10.0-15.0	7.4-8.4	---	---	---	---
	4-11	10-18	10.0-15.0	7.4-8.4	---	---	---	---
	11-28	10-18	5.0-15.0	7.9-8.4	5-15	---	0-2	---
	28-60	3-18	5.0-10.0	7.9-8.4	5-15	---	0-4	---
Twilight-----	0-5	5-18	10.0-15.0	6.6-7.8	---	---	---	---
	5-15	5-18	5.0-10.0	6.6-7.8	---	---	---	---
	15-30	5-18	5.0-10.0	7.4-8.4	5-10	---	0-4	---
	30-60	---	---	---	---	---	---	---

Chemical Properties of the Soils--Continued

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
943C:								
Tally-----	0-5	10-20	15.0-20.0	6.1-7.8	---	---	---	---
	5-24	5-18	5.0-10.0	6.6-7.8	---	---	---	---
	24-60	5-18	5.0-10.0	7.4-8.4	5-15	---	0-2	---
943E:								
Tally-----	0-5	10-20	15.0-20.0	6.1-7.8	---	---	---	---
	5-24	5-18	5.0-10.0	6.6-7.8	---	---	---	---
	24-60	5-18	5.0-10.0	7.4-8.4	5-15	---	0-2	---
Vebar-----	0-7	10-18	10.0-15.0	6.1-7.8	---	---	---	---
	7-31	10-18	10.0-15.0	7.4-8.4	0-5	---	---	---
	31-60	---	---	---	---	---	---	---
943F:								
Tally-----	0-5	10-20	15.0-20.0	6.1-7.8	---	---	---	---
	5-24	5-18	5.0-10.0	6.6-7.8	---	---	---	---
	24-60	5-18	5.0-10.0	7.4-8.4	5-15	---	0-2	---
Cohagen-----	0-4	10-18	5.0-10.0	7.4-7.8	1-5	---	---	---
	4-15	10-18	5.0-10.0	7.4-8.4	1-5	---	---	---
	15-60	---	---	---	---	---	---	---
965F:								
Cabba-----	0-3	20-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	3-15	20-35	5.0-10.0	7.4-9.0	5-15	---	2-8	---
	15-60	---	---	---	---	---	---	---
Macar-----	0-6	18-27	15.0-20.0	6.6-8.4	---	---	---	---
	6-15	18-35	15.0-20.0	6.6-8.4	---	---	0-2	---
	15-45	18-35	15.0-20.0	7.4-8.4	8-15	---	0-2	---
	45-60	15-30	10.0-15.0	7.4-8.4	5-12	---	0-2	---
971F:								
Neldore-----	0-4	40-50	30.0-35.0	5.6-7.8	---	---	0-2	---
	4-15	40-60	30.0-35.0	5.6-7.8	---	---	0-4	---
	15-60	---	---	---	---	---	---	---
Bascovy-----	0-4	40-60	30.0-40.0	6.6-7.8	---	---	2-4	1-5
	4-15	45-60	30.0-35.0	6.1-7.8	0-5	---	2-4	5-10
	15-29	45-60	30.0-35.0	5.1-7.3	---	1-5	2-8	10-15
	29-60	---	---	---	---	---	---	---
972F:								
Neldore-----	0-4	40-50	30.0-35.0	5.6-7.8	---	---	0-2	---
	4-15	40-60	30.0-35.0	5.6-7.8	---	---	0-4	---
	15-60	---	---	---	---	---	---	---
Rock outcrop----								
974F:								
Neldore-----	0-4	40-50	30.0-35.0	5.6-7.8	---	---	0-2	---
	4-15	40-60	30.0-35.0	5.6-7.8	---	---	0-4	---
	15-60	---	---	---	---	---	---	---
Hillon-----	0-4	20-27	20.0-25.0	7.4-8.4	5-10	---	0-2	---
	4-60	20-35	15.0-20.0	7.9-9.0	5-15	---	0-2	---

Water Features

Map symbol and soil name	Hydro- logic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
2: Riverwash-----									
2B: Marcott-----	C	None	---	---	2.0-4.0	Apparent	Apr-Jun	---	---
Big sandy-----	D	Occasional	Brief	Apr-Jun	1.0-2.0	Apparent	Dec-Jun	---	---
12C: Beaverton-----	B	None	---	---	>6.0	---	---	---	---
Beaverton-----	B	None	---	---	>6.0	---	---	---	---
13C: Tanna-----	D	None	---	---	>6.0	---	---	---	---
15E: Lambeth-----	B	None	---	---	>6.0	---	---	---	---
15F: Lambeth-----	B	None	---	---	>6.0	---	---	---	---
16B: Degrand-----	B	None	---	---	>6.0	---	---	---	---
17B: Delpoint-----	C	None	---	---	>6.0	---	---	---	---
21E: Cabbart-----	D	None	---	---	>6.0	---	---	---	---
Delpoint-----	C	None	---	---	>6.0	---	---	---	---
22F: Hillon-----	C	None	---	---	>6.0	---	---	---	---
27B: Attewan-----	B	None	---	---	>6.0	---	---	---	---
28: Nishon-----	D	Rare	Brief	Jan-Jul	---	---	Apr-Aug	Long	1.0
30B: Marvan-----	D	None	---	---	>6.0	---	---	---	---
30C: Marvan-----	D	None	---	---	>6.0	---	---	---	---
31A: Ferd-----	C	None	---	---	>6.0	---	---	---	---
32B: Kobase-----	C	None	---	---	>6.0	---	---	---	---
32C: Kobase-----	C	None	---	---	>6.0	---	---	---	---
32D: Kobase-----	C	None	---	---	>6.0	---	---	---	---

Water Features--Continued

Map symbol and soil name	Hydro- logic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
33A: Phillips-----	C	None	---	---	>6.0	---	---	---	---
34A: Linnet-----	C	None	---	---	>6.0	---	---	---	---
35B: Assinniboine----	B	None	---	---	>6.0	---	---	---	---
36B: Chinook-----	B	None	---	---	>6.0	---	---	---	---
36C: Chinook-----	B	None	---	---	>6.0	---	---	---	---
37B: Evanston-----	B	None	---	---	>6.0	---	---	---	---
37C: Evanston-----	B	None	---	---	>6.0	---	---	---	---
38B: Ethridge-----	C	None	---	---	>6.0	---	---	---	---
39B: Assinniboine----	B	None	---	---	>6.0	---	---	---	---
43A: Pendroy-----	D	None	---	---	>6.0	---	---	---	---
44B: Kevin-----	C	None	---	---	>6.0	---	---	---	---
47B: Marias-----	D	None	---	---	>6.0	---	---	---	---
47C: Marias-----	D	None	---	---	>6.0	---	---	---	---
48A: Vanda-----	D	None	---	---	>6.0	---	---	---	---
48C: Vanda-----	D	None	---	---	>6.0	---	---	---	---
50A: Telstad-----	C	None	---	---	>6.0	---	---	---	---
55B: Lihen-----	A	None	---	---	>6.0	---	---	---	---
56A: Scobey-----	C	None	---	---	>6.0	---	---	---	---
57B: Absarokee-----	C	None	---	---	>6.0	---	---	---	---
57C: Absarokee-----	C	None	---	---	>6.0	---	---	---	---

Water Features--Continued

Map symbol and soil name	Hydro- logic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
57E:									
Absarokee-----	C	None	---	---	>6.0	---	---	---	---
Reeder-----	C	None	---	---	>6.0	---	---	---	---
58B:									
Lonna-----	B	None	---	---	>6.0	---	---	---	---
58C:									
Lonna-----	B	None	---	---	>6.0	---	---	---	---
60A:									
Havre-----	B	Rare	Brief	Jan-Jul	>6.0	---	---	---	---
63:									
Lardell-----	C	Rare	Brief	Jan-Jul	1.0-3.0	Apparent	May-Aug	---	---
67B:									
Bearpaw-----	C	None	---	---	>6.0	---	---	---	---
67C:									
Bearpaw-----	C	None	---	---	>6.0	---	---	---	---
68B:									
Gerber-----	D	None	---	---	>6.0	---	---	---	---
69C:									
Vida-----	C	None	---	---	>6.0	---	---	---	---
Zahill-----	C	None	---	---	>6.0	---	---	---	---
71D:									
Roy-----	B	None	---	---	>6.0	---	---	---	---
72F:									
Zahill-----	C	None	---	---	>6.0	---	---	---	---
73B:									
Yetull-----	A	None	---	---	>6.0	---	---	---	---
Lonesome-----	B	None	---	---	>6.0	---	---	---	---
74C:									
Shambo-----	B	None	---	---	>6.0	---	---	---	---
75B:									
Farnuf-----	B	None	---	---	>6.0	---	---	---	---
75C:									
Farnuf-----	B	None	---	---	>6.0	---	---	---	---
76C:									
Hedoes-----	C	None	---	---	>6.0	---	---	---	---
77F:									
Tinsley-----	A	None	---	---	>6.0	---	---	---	---
79B:									
Yamacall-----	B	None	---	---	>6.0	---	---	---	---

Water Features--Continued

Map symbol and soil name	Hydro- logic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
79C: Yamacall-----	B	None	---	---	>6.0	---	---	---	---
79D: Yamacall-----	B	None	---	---	>6.0	---	---	---	---
81A: Glendive-----	B	Rare	Brief	Jan-Jul	>6.0	---	---	---	---
82B: Savage-----	C	None	---	---	>6.0	---	---	---	---
86B: Work-----	C	None	---	---	>6.0	---	---	---	---
86C: Work-----	C	None	---	---	>6.0	---	---	---	---
86D: Work-----	C	None	---	---	>6.0	---	---	---	---
87B: Tamaneen-----	B	None	---	---	>6.0	---	---	---	---
88C: Perma-----	B	None	---	---	>6.0	---	---	---	---
90A: Harlake-----	C	Rare	Brief	Jan-Jul	>6.0	---	---	---	---
92E: Sunburst-----	C	None	---	---	>6.0	---	---	---	---
Bascovy-----	D	None	---	---	>6.0	---	---	---	---
93F: Yetull-----	A	None	---	---	>6.0	---	---	---	---
94B: Busby-----	B	None	---	---	>6.0	---	---	---	---
94C: Busby-----	B	None	---	---	>6.0	---	---	---	---
94D: Busby-----	B	None	---	---	>6.0	---	---	---	---
96B: Macar-----	B	None	---	---	>6.0	---	---	---	---
96C: Macar-----	B	None	---	---	>6.0	---	---	---	---
98B: Kremlin-----	B	None	---	---	>6.0	---	---	---	---
98C: Kremlin-----	B	None	---	---	>6.0	---	---	---	---

Water Features--Continued

Map symbol and soil name	Hydro- logic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
99:									
Rivra-----	D	Occasional	Brief	Apr-Jun	>6.0	---	---	---	---
Hanly-----	A	Occasional	Brief	Mar-Jun	>6.0	---	---	---	---
110C:									
Lacey Creek-----	B	None	---	---	>6.0	---	---	---	---
110D:									
Lacey Creek-----	B	None	---	---	>6.0	---	---	---	---
110E:									
Lacey Creek-----	B	None	---	---	>6.0	---	---	---	---
130A:									
Nesda-----	B	Occasional	Brief	Apr-Jun	>6.0	---	---	---	---
Nesda-----	B	Occasional	Brief	Apr-Jun	>6.0	---	---	---	---
McIlwaine-----	B	Occasional	Brief	Apr-Jun	>6.0	---	---	---	---
140A:									
Klayent-----	C	Rare	Brief	Jan-Jul	1.0-3.0	Apparent	Apr-Jul	---	---
141B:									
Megonot-----	C	None	---	---	>6.0	---	---	---	---
Weingart-----	D	None	---	---	>6.0	---	---	---	---
Delpoint-----	C	None	---	---	>6.0	---	---	---	---
142C:									
Megonot-----	C	None	---	---	>6.0	---	---	---	---
Kobase-----	C	None	---	---	>6.0	---	---	---	---
Delpoint-----	C	None	---	---	>6.0	---	---	---	---
160A:									
Bigsandy-----	D	Occasional	Long	Apr-Jun	1.0-2.0	Apparent	Dec-Jun	---	---
171C:									
Delpoint-----	C	None	---	---	>6.0	---	---	---	---
Cabbart-----	D	None	---	---	>6.0	---	---	---	---
180A:									
McIlwaine-----	B	Rare	Brief	Jan-Jul	>6.0	---	---	---	---
Nesda-----	B	Rare	Brief	Jan-Jul	>6.0	---	---	---	---
Straw-----	B	Rare	Brief	Jan-Jul	>6.0	---	---	---	---
182F:									
Megonot-----	C	None	---	---	>6.0	---	---	---	---
Yawdim-----	D	None	---	---	>6.0	---	---	---	---

Water Features--Continued

Map symbol and soil name	Hydro- logic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
229E:									
Hillon-----	C	None	---	---	>6.0	---	---	---	---
Lambeth-----	B	None	---	---	>6.0	---	---	---	---
232A:									
Acel-----	C	None	---	---	>6.0	---	---	---	---
251C:									
Bascovy-----	D	None	---	---	>6.0	---	---	---	---
Neldore-----	D	None	---	---	>6.0	---	---	---	---
251E:									
Bascovy-----	D	None	---	---	>6.0	---	---	---	---
Neldore-----	D	None	---	---	>6.0	---	---	---	---
252C:									
Bascovy-----	D	None	---	---	>6.0	---	---	---	---
Marvan-----	D	None	---	---	>6.0	---	---	---	---
261B:									
Absher-----	D	None	---	---	>6.0	---	---	---	---
Nobe-----	D	None	---	---	>6.0	---	---	---	---
263A:									
Toston-----	C	Rare	Brief	Jan-Jul	3.0-5.0	Apparent	Nov-Jun	---	---
264A:									
Toston-----	C	Rare	Brief	Jan-Jul	3.0-5.0	Apparent	Nov-Jun	---	---
Nobe-----	D	Rare	Brief	Jan-Jul	4.0-6.0	Apparent	Dec-Jun	---	---
265B:									
Absher-----	D	None	---	---	>6.0	---	---	---	---
Gerdrum-----	D	None	---	---	>6.0	---	---	---	---
272C:									
Attewan-----	B	None	---	---	>6.0	---	---	---	---
Tinsley-----	A	None	---	---	>6.0	---	---	---	---
301A:									
Marvan-----	D	None	---	---	>6.0	---	---	---	---
Vanda-----	D	None	---	---	>6.0	---	---	---	---
301C:									
Marvan-----	D	None	---	---	>6.0	---	---	---	---
Vanda-----	D	None	---	---	>6.0	---	---	---	---
303A:									
Flatcreek-----	D	Occasional	Brief	Apr-Jun	3.5-5.0	Apparent	Nov-Jun	---	---
Nobe-----	D	Occasional	Brief	Apr-Jun	4.0-6.0	Apparent	Nov-Jun	---	---

Water Features--Continued

Map symbol and soil name	Hydro- logic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
305A:									
Marvan-----	D	None	---	---	>6.0	---	---	---	---
Nobe-----	D	None	---	---	>6.0	---	---	---	---
311B:									
Ferd-----	C	None	---	---	>6.0	---	---	---	---
Creed-----	C	None	---	---	>6.0	---	---	---	---
Gerdrum-----	D	None	---	---	>6.0	---	---	---	---
311C:									
Ferd-----	C	None	---	---	>6.0	---	---	---	---
Creed-----	C	None	---	---	>6.0	---	---	---	---
Gerdrum-----	D	None	---	---	>6.0	---	---	---	---
323B:									
Sagedale-----	C	None	---	---	>6.0	---	---	---	---
323C:									
Sagedale-----	C	None	---	---	>6.0	---	---	---	---
324B:									
Marcott-----	C	None	---	---	2.0-4.0	Apparent	Apr-Jun	---	---
331B:									
Phillips-----	C	None	---	---	>6.0	---	---	---	---
Elloam-----	D	None	---	---	>6.0	---	---	---	---
331C:									
Phillips-----	C	None	---	---	>6.0	---	---	---	---
Elloam-----	D	None	---	---	>6.0	---	---	---	---
334B:									
Phillips-----	C	None	---	---	>6.0	---	---	---	---
Kevin-----	C	None	---	---	>6.0	---	---	---	---
341B:									
Linnnet-----	C	None	---	---	>6.0	---	---	---	---
Marias-----	D	None	---	---	>6.0	---	---	---	---
351B:									
Kenilworth-----	C	None	---	---	>6.0	---	---	---	---
Fortbenton-----	C	None	---	---	>6.0	---	---	---	---
361B:									
Fortbenton-----	C	None	---	---	>6.0	---	---	---	---
362C:									
Chinook-----	B	None	---	---	>6.0	---	---	---	---
Yetull-----	A	None	---	---	>6.0	---	---	---	---

Water Features--Continued

Map symbol and soil name	Hydro- logic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
363B:									
Cozberg-----	B	None	---	---	>6.0	---	---	---	---
Chinook-----	B	None	---	---	>6.0	---	---	---	---
363C:									
Chinook-----	B	None	---	---	>6.0	---	---	---	---
Lihen-----	A	None	---	---	>6.0	---	---	---	---
364B:									
Chinook-----	B	None	---	---	>6.0	---	---	---	---
364C:									
Chinook-----	B	None	---	---	>6.0	---	---	---	---
365B:									
Fortbenton-----	C	None	---	---	>6.0	---	---	---	---
Chinook-----	B	None	---	---	>6.0	---	---	---	---
368C:									
Fortbenton-----	C	None	---	---	>6.0	---	---	---	---
Hillon-----	C	None	---	---	>6.0	---	---	---	---
372C:									
Evanston-----	B	None	---	---	>6.0	---	---	---	---
Yamacall-----	B	None	---	---	>6.0	---	---	---	---
375B:									
Evanston-----	B	None	---	---	>6.0	---	---	---	---
Lonna-----	B	None	---	---	>6.0	---	---	---	---
377B:									
Evanston-----	B	None	---	---	>6.0	---	---	---	---
Degrad-----	B	None	---	---	>6.0	---	---	---	---
381B:									
Ethridge-----	C	None	---	---	>6.0	---	---	---	---
385B:									
Ethridge-----	C	None	---	---	>6.0	---	---	---	---
Kobase-----	C	None	---	---	>6.0	---	---	---	---
386B:									
Ethridge-----	C	None	---	---	>6.0	---	---	---	---
Evanston-----	B	None	---	---	>6.0	---	---	---	---
388A:									
Ethridge-----	C	None	---	---	>6.0	---	---	---	---
Lonna-----	B	None	---	---	>6.0	---	---	---	---

Water Features--Continued

Map symbol and soil name	Hydro- logic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
402A:									
Gerdum-----	D	None	---	---	>6.0	---	---	---	---
Absher-----	D	None	---	---	>6.0	---	---	---	---
Creed-----	C	None	---	---	>6.0	---	---	---	---
410:									
Rock outcrop----									
Fleak-----	D	None	---	---	>6.0	---	---	---	---
411D:									
Farnuf-----	B	None	---	---	>6.0	---	---	---	---
Reeder-----	C	None	---	---	>6.0	---	---	---	---
411E:									
Reeder-----	C	None	---	---	>6.0	---	---	---	---
Farnuf-----	B	None	---	---	>6.0	---	---	---	---
421C:									
Joplin-----	C	None	---	---	>6.0	---	---	---	---
Hillon-----	C	None	---	---	>6.0	---	---	---	---
422C:									
Marmarth-----	C	None	---	---	>6.0	---	---	---	---
441C:									
Kevin-----	C	None	---	---	>6.0	---	---	---	---
Hillon-----	C	None	---	---	>6.0	---	---	---	---
442C:									
Kevin-----	C	None	---	---	>6.0	---	---	---	---
Elloam-----	D	None	---	---	>6.0	---	---	---	---
444D:									
Kevin-----	C	None	---	---	>6.0	---	---	---	---
Scobey-----	C	None	---	---	>6.0	---	---	---	---
451C:									
Turner-----	B	None	---	---	>6.0	---	---	---	---
Beaverton-----	B	None	---	---	>6.0	---	---	---	---
Beaverton-----	B	None	---	---	>6.0	---	---	---	---
460:									
Lacey Creek-----	B	None	---	---	>6.0	---	---	---	---
471B:									
Marias-----	D	None	---	---	>6.0	---	---	---	---
Kobase-----	C	None	---	---	>6.0	---	---	---	---

Water Features--Continued

Map symbol and soil name	Hydro- logic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
481A: Bigsag-----	D	Rare	Brief	Jan-Jul	1.0-3.0	Apparent	Dec-Jun	---	---
493A: Enbar-----	B	Occasional	Brief	Mar-Jun	2.5-5.0	Apparent	Apr-Jul	---	---
Straw-----	B	Rare	Brief	Jan-Jul	>6.0	---	---	---	---
Eagleton-----	D	Occasional	Brief	Apr-Jun	1.0-2.0	Apparent	Nov-Jun	---	---
503B: Telstad-----	C	None	---	---	>6.0	---	---	---	---
Joplin-----	C	None	---	---	>6.0	---	---	---	---
503C: Telstad-----	C	None	---	---	>6.0	---	---	---	---
Joplin-----	C	None	---	---	>6.0	---	---	---	---
510: Rock outcrop---									
Belain-----	C	None	---	---	>6.0	---	---	---	---
511A: Martinsdale----	B	None	---	---	>6.0	---	---	---	---
Turner-----	B	None	---	---	>6.0	---	---	---	---
511C: Martinsdale----	B	None	---	---	>6.0	---	---	---	---
512C: Martinsdale----	B	None	---	---	>6.0	---	---	---	---
521B: Thoeny-----	D	None	---	---	>6.0	---	---	---	---
Elloam-----	D	None	---	---	>6.0	---	---	---	---
Absher-----	D	None	---	---	>6.0	---	---	---	---
530F: Warwood-----	B	None	---	---	>6.0	---	---	---	---
531A: Sweetgrass-----	B	None	---	---	>6.0	---	---	---	---
Beaverton-----	B	None	---	---	>6.0	---	---	---	---
531C: Sweetgrass-----	B	None	---	---	>6.0	---	---	---	---
Beaverton-----	B	None	---	---	>6.0	---	---	---	---
Beaverton-----	B	None	---	---	>6.0	---	---	---	---

Water Features--Continued

Map symbol and soil name	Hydro- logic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
550F:									
Libeg-----	B	None	---	---	>6.0	---	---	---	---
Arrowpeak-----	D	None	---	---	>6.0	---	---	---	---
Elkner-----	B	None	---	---	>6.0	---	---	---	---
551B:									
Lonesome-----	B	None	---	---	>6.0	---	---	---	---
560F:									
Elve-----	B	None	---	---	>6.0	---	---	---	---
Rock outcrop----									
561B:									
Scobey-----	C	None	---	---	>6.0	---	---	---	---
Kevin-----	C	None	---	---	>6.0	---	---	---	---
561C:									
Scobey-----	C	None	---	---	>6.0	---	---	---	---
Kevin-----	C	None	---	---	>6.0	---	---	---	---
562B:									
Scobey-----	C	None	---	---	>6.0	---	---	---	---
Linnet-----	C	None	---	---	>6.0	---	---	---	---
563A:									
Fortbenton-----	C	None	---	---	>6.0	---	---	---	---
Scobey-----	C	None	---	---	>6.0	---	---	---	---
580F:									
Garlet-----	B	None	---	---	>6.0	---	---	---	---
Elkner-----	B	None	---	---	>6.0	---	---	---	---
601A:									
Havre-----	B	Rare	Brief	Jan-Jul	>6.0	---	---	---	---
Glendive-----	B	Rare	Brief	Jan-Jul	>6.0	---	---	---	---
602A:									
Havre-----	B	Rare	Brief	Jan-Jul	>6.0	---	---	---	---
603A:									
Havre-----	B	Occasional	Brief	Apr-Jun	>6.0	---	---	---	---
Glendive-----	B	Occasional	Brief	Apr-Jun	>6.0	---	---	---	---
605C:									
Yamacall-----	B	None	---	---	>6.0	---	---	---	---
Havre-----	B	Occasional	Brief	Apr-Jun	>6.0	---	---	---	---

Water Features--Continued

Map symbol and soil name	Hydro- logic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
621E:									
Sagedale-----	C	None	---	---	>6.0	---	---	---	---
Wayden-----	D	None	---	---	>6.0	---	---	---	---
621F:									
Wayden-----	D	None	---	---	>6.0	---	---	---	---
Sagedale-----	C	None	---	---	>6.0	---	---	---	---
623F:									
Linwell-----	C	None	---	---	>6.0	---	---	---	---
Winifred-----	C	None	---	---	>6.0	---	---	---	---
630E:									
Crow-----	C	None	---	---	>6.0	---	---	---	---
Lubrecht-----	C	None	---	---	>6.0	---	---	---	---
641F:									
Norbert-----	D	None	---	---	>6.0	---	---	---	---
Barkof-----	D	None	---	---	>6.0	---	---	---	---
650D:									
Laceycreek-----	B	None	---	---	>6.0	---	---	---	---
Ambrant-----	B	None	---	---	>6.0	---	---	---	---
650F:									
Laceycreek-----	B	None	---	---	>6.0	---	---	---	---
Eaglecreek-----	B	None	---	---	>6.0	---	---	---	---
653F:									
Fleak-----	D	None	---	---	>6.0	---	---	---	---
Twilight-----	B	None	---	---	>6.0	---	---	---	---
Yetull-----	A	None	---	---	>6.0	---	---	---	---
654F:									
Fleak-----	D	None	---	---	>6.0	---	---	---	---
Twilight-----	B	None	---	---	>6.0	---	---	---	---
Rock outcrop----									
661E:									
Twilight-----	B	None	---	---	>6.0	---	---	---	---
Fleak-----	D	None	---	---	>6.0	---	---	---	---
671B:									
Bearpaw-----	C	None	---	---	>6.0	---	---	---	---
Vida-----	C	None	---	---	>6.0	---	---	---	---

Water Features--Continued

Map symbol and soil name	Hydro- logic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
671C:									
Bearpaw-----	C	None	---	---	>6.0	---	---	---	---
Vida-----	C	None	---	---	>6.0	---	---	---	---
673A:									
Bearpaw-----	C	None	---	---	>6.0	---	---	---	---
Daglum-----	D	None	---	---	>6.0	---	---	---	---
674B:									
Bearpaw-----	C	None	---	---	>6.0	---	---	---	---
Waltham-----	D	None	---	---	>6.0	---	---	---	---
680F:									
Winkler-----	B	None	---	---	>6.0	---	---	---	---
Ambrant-----	B	None	---	---	>6.0	---	---	---	---
Winkler-----	B	None	---	---	>6.0	---	---	---	---
681C:									
Gerber-----	D	None	---	---	>6.0	---	---	---	---
691D:									
Vida-----	C	None	---	---	>6.0	---	---	---	---
Williams-----	B	None	---	---	>6.0	---	---	---	---
692D:									
Vida-----	C	None	---	---	>6.0	---	---	---	---
Bearpaw-----	C	None	---	---	>6.0	---	---	---	---
693C:									
Vida-----	C	None	---	---	>6.0	---	---	---	---
Bearpaw-----	C	None	---	---	>6.0	---	---	---	---
Nishon-----	D	Rare	Brief	Jan-Jul	---	---	Apr-Aug	Long	1.0
701E:									
Work-----	C	None	---	---	>6.0	---	---	---	---
Absarokee-----	C	None	---	---	>6.0	---	---	---	---
702E:									
Work-----	C	None	---	---	>6.0	---	---	---	---
Absarokee-----	C	None	---	---	>6.0	---	---	---	---
721E:									
Zahill-----	C	None	---	---	>6.0	---	---	---	---
Vida-----	C	None	---	---	>6.0	---	---	---	---

Water Features--Continued

Map symbol and soil name	Hydro- logic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
722F:									
Zahill-----	C	None	---	---	>6.0	---	---	---	---
Sagedale-----	C	None	---	---	>6.0	---	---	---	---
Wayden-----	D	None	---	---	>6.0	---	---	---	---
723F:									
Zahill-----	C	None	---	---	>6.0	---	---	---	---
Cabba-----	D	None	---	---	>6.0	---	---	---	---
731F:									
Yetull-----	A	None	---	---	>6.0	---	---	---	---
Dune land-----									
741B:									
Shambo-----	B	None	---	---	>6.0	---	---	---	---
Straw-----	B	Occasional	Brief	Mar-Jun	>6.0	---	---	---	---
745F:									
Shambo-----	B	None	---	---	>6.0	---	---	---	---
Amor-----	B	None	---	---	>6.0	---	---	---	---
Cabba-----	D	None	---	---	>6.0	---	---	---	---
761C:									
Hedoes-----	C	None	---	---	>6.0	---	---	---	---
Belain-----	C	None	---	---	>6.0	---	---	---	---
761E:									
Hedoes-----	C	None	---	---	>6.0	---	---	---	---
Belain-----	C	None	---	---	>6.0	---	---	---	---
793B:									
Yamacall-----	B	None	---	---	>6.0	---	---	---	---
793C:									
Yamacall-----	B	None	---	---	>6.0	---	---	---	---
795C:									
Yamacall-----	B	None	---	---	>6.0	---	---	---	---
Benz-----	C	None	---	---	>6.0	---	---	---	---
795D:									
Yamacall-----	B	None	---	---	>6.0	---	---	---	---
Benz-----	C	None	---	---	>6.0	---	---	---	---
801B:									
Williams-----	B	None	---	---	>6.0	---	---	---	---
Vida-----	C	None	---	---	>6.0	---	---	---	---

Water Features--Continued

Map symbol and soil name	Hydro- logic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
801C:									
Williams-----	B	None	---	---	>6.0	---	---	---	---
Vida-----	C	None	---	---	>6.0	---	---	---	---
828A:									
Savage-----	C	None	---	---	>6.0	---	---	---	---
842A:									
Savage-----	C	None	---	---	4.0-6.0	Apparent	Dec-Jul	---	---
Daglum-----	D	None	---	---	4.0-6.0	Apparent	Dec-Jul	---	---
863E:									
Work-----	C	None	---	---	>6.0	---	---	---	---
Roy-----	B	None	---	---	>6.0	---	---	---	---
871B:									
Tamaneen-----	B	None	---	---	>6.0	---	---	---	---
871C:									
Tamaneen-----	B	None	---	---	>6.0	---	---	---	---
883F:									
Perma-----	B	None	---	---	>6.0	---	---	---	---
Whitlash-----	D	None	---	---	>6.0	---	---	---	---
892F:									
Whitlash-----	D	None	---	---	>6.0	---	---	---	---
Belain-----	C	None	---	---	>6.0	---	---	---	---
Rock outcrop----									
895F:									
Belain-----	C	None	---	---	>6.0	---	---	---	---
Whitlash-----	D	None	---	---	>6.0	---	---	---	---
Hedoes-----	C	None	---	---	>6.0	---	---	---	---
896E:									
Belain-----	C	None	---	---	>6.0	---	---	---	---
Whitlash-----	D	None	---	---	>6.0	---	---	---	---
Rock outcrop----									
911F:									
Belain-----	C	None	---	---	>6.0	---	---	---	---
Whitlash-----	D	None	---	---	>6.0	---	---	---	---
Hedoes-----	C	None	---	---	>6.0	---	---	---	---
916C:									
Belain-----	C	None	---	---	>6.0	---	---	---	---
Hedoes-----	C	None	---	---	>6.0	---	---	---	---

Water Features--Continued

Map symbol and soil name	Hydro- logic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
925F:									
Sunburst-----	C	None	---	---	>6.0	---	---	---	---
Lambeth-----	B	None	---	---	>6.0	---	---	---	---
941D:									
Busby-----	B	None	---	---	>6.0	---	---	---	---
Twilight-----	B	None	---	---	>6.0	---	---	---	---
943C:									
Tally-----	B	None	---	---	>6.0	---	---	---	---
943E:									
Tally-----	B	None	---	---	>6.0	---	---	---	---
Vebar-----	B	None	---	---	>6.0	---	---	---	---
943F:									
Tally-----	B	None	---	---	>6.0	---	---	---	---
Cohagen-----	D	None	---	---	>6.0	---	---	---	---
965F:									
Cabba-----	D	None	---	---	>6.0	---	---	---	---
Macar-----	B	None	---	---	>6.0	---	---	---	---
971F:									
Neldore-----	D	None	---	---	>6.0	---	---	---	---
Bascovy-----	D	None	---	---	>6.0	---	---	---	---
972F:									
Neldore-----	D	None	---	---	>6.0	---	---	---	---
Rock outcrop---									
974F:									
Neldore-----	D	None	---	---	>6.0	---	---	---	---
Hillon-----	C	None	---	---	>6.0	---	---	---	---

Soil Features

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
2:					
Riverwash-----					
2B:					
Marcott-----	>60	---	High	High	Low
Bigsandy-----	>60	---	High	High	High
12C:					
Beaverton-----	>60	---	Moderate	High	Low
Beaverton-----	>60	---	Moderate	High	Low
13C:					
Tanna-----	20-40	Soft	Low	High	Low
15E:					
Lambeth-----	>60	---	Moderate	High	Low
15F:					
Lambeth-----	>60	---	Moderate	High	Low
16B:					
Degrad-----	>60	---	Moderate	High	Low
17B:					
Delpoint-----	20-40	Soft	Moderate	High	Low
21E:					
Cabbart-----	10-20	Soft	Moderate	High	Low
Delpoint-----	20-40	Soft	Moderate	High	Low
22F:					
Hillon-----	>60	---	Moderate	High	Low
27B:					
Attewan-----	>60	---	Moderate	High	Low
28:					
Nishon-----	>60	---	Moderate	High	Low
30B:					
Marvan-----	>60	---	Low	High	Moderate
30C:					
Marvan-----	>60	---	Low	High	Moderate
31A:					
Ferd-----	>60	---	Low	High	Low
32B:					
Kobase-----	>60	---	Low	High	Low
32C:					
Kobase-----	>60	---	Low	High	Low
32D:					
Kobase-----	>60	---	Low	High	Low

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
33A: Phillips-----	>60	---	Low	High	Low
34A: Linnet-----	>60	---	Low	High	Low
35B: Assinniboine----	>60	---	Moderate	High	Low
36B: Chinook-----	>60	---	Moderate	High	Low
36C: Chinook-----	>60	---	Moderate	High	Low
37B: Evanston-----	>60	---	Moderate	High	Low
37C: Evanston-----	>60	---	Moderate	High	Low
38B: Ethridge-----	>60	---	Low	High	Low
39B: Assinniboine----	>60	---	Moderate	High	Low
43A: Pendroy-----	>60	---	Low	High	Moderate
44B: Kevin-----	>60	---	Moderate	High	Low
47B: Marias-----	>60	---	Low	High	Low
47C: Marias-----	>60	---	Low	High	Low
48A: Vanda-----	>60	---	Low	High	Moderate
48C: Vanda-----	>60	---	Low	High	Moderate
50A: Telstad-----	>60	---	Low	High	Low
55B: Lihen-----	>60	---	Low	High	Low
56A: Scobey-----	>60	---	Low	High	Low
57B: Absarokee-----	20-40	Soft	Low	High	Low
57C: Absarokee-----	20-40	Soft	Low	High	Low

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential	Risk of corrosion	
	Depth	Hardness	frost action	Uncoated steel	Concrete
	In				
57E:					
Absarokee-----	20-40	Soft	Low	High	Low
Reeder-----	20-40	Soft	Moderate	High	Low
58B:					
Lonna-----	>60	---	Moderate	High	Low
58C:					
Lonna-----	>60	---	Moderate	High	Low
60A:					
Havre-----	>60	---	Moderate	High	Low
63:					
Lardell-----	>60	---	High	High	High
67B:					
Bearpaw-----	>60	---	Moderate	High	Moderate
67C:					
Bearpaw-----	>60	---	Moderate	High	Moderate
68B:					
Gerber-----	>60	---	Low	High	Low
69C:					
Vida-----	>60	---	Moderate	High	Low
Zahill-----	>60	---	Moderate	High	Low
71D:					
Roy-----	>60	---	Moderate	High	Low
72F:					
Zahill-----	>60	---	Moderate	High	Low
73B:					
Yetull-----	>60	---	Low	High	Low
Lonesome-----	>60	---	Moderate	High	Low
74C:					
Shambo-----	>60	---	Moderate	High	Low
75B:					
Farnuf-----	>60	---	Moderate	High	Low
75C:					
Farnuf-----	>60	---	Moderate	High	Low
76C:					
Hedoes-----	>60	---	Moderate	High	Low
77F:					
Tinsley-----	>60	---	Low	High	Low
79B:					
Yamacall-----	>60	---	Moderate	High	Low

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential	Risk of corrosion	
	Depth	Hardness	frost action	Uncoated steel	Concrete
	In				
79C: Yamacall-----	>60	---	Moderate	High	Low
79D: Yamacall-----	>60	---	Moderate	High	Low
81A: Glendive-----	>60	---	Moderate	High	Low
82B: Savage-----	>60	---	Low	High	Low
86B: Work-----	>60	---	Moderate	High	Low
86C: Work-----	>60	---	Moderate	High	Low
86D: Work-----	>60	---	Moderate	High	Low
87B: Tamaneen-----	>60	---	Moderate	High	Low
88C: Perma-----	>60	---	Moderate	Moderate	Low
90A: Harlake-----	>60	---	Low	High	Low
92E: Sunburst-----	>60	---	Low	High	Low
Bascovy-----	20-40	Soft	Low	High	High
93F: Yetull-----	>60	---	Low	High	Low
94B: Busby-----	>60	---	Moderate	High	Low
94C: Busby-----	>60	---	Moderate	High	Low
94D: Busby-----	>60	---	Moderate	High	Low
96B: Macar-----	>60	---	Moderate	High	Low
96C: Macar-----	>60	---	Moderate	High	Low
98B: Kremlin-----	>60	---	Moderate	High	Low
98C: Kremlin-----	>60	---	Moderate	High	Low

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
99:					
Rivra-----	>60	---	Low	High	Low
Manly-----	>60	---	Low	Moderate	Low
110C:					
Laceycreek-----	>60	---	Moderate	High	Low
110D:					
Laceycreek-----	>60	---	Moderate	High	Low
110E:					
Laceycreek-----	>60	---	Moderate	High	Low
130A:					
Nesda-----	>60	---	Low	High	Low
Nesda-----	>60	---	Low	High	Low
McIlwaine-----	>60	---	Moderate	High	Low
140A:					
Klayent-----	>60	---	High	High	Moderate
141B:					
Megonot-----	20-40	Soft	Low	High	Low
Weingart-----	20-40	Soft	Low	High	Moderate
Delpoint-----	20-40	Soft	Moderate	High	Low
142C:					
Megonot-----	20-40	Soft	Low	High	Low
Kabase-----	>60	---	Low	High	Low
Delpoint-----	20-40	Soft	Moderate	High	Low
160A:					
Bigsandy-----	>60	---	High	High	High
171C:					
Delpoint-----	20-40	Soft	Moderate	High	Low
Cabbart-----	10-20	Soft	Moderate	High	Low
180A:					
McIlwaine-----	>60	---	Moderate	Moderate	Low
Nesda-----	>60	---	Low	High	Low
Straw-----	>60	---	Moderate	High	Low
182F:					
Megonot-----	20-40	Soft	Low	High	Low
Yawdim-----	10-20	Soft	Low	High	Low
200:					
Badland-----					

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential	Risk of corrosion	
	Depth	Hardness	frost action	Uncoated steel	Concrete
	In				
201F:					
Cabba-----	10-20	Soft	Moderate	High	Low
Wayden-----	10-20	Soft	Low	High	Low
Rock outcrop----					
210C:					
Shane-----	20-40	Soft	Low	High	Low
Gerber-----	>60	---	Low	High	Low
210E:					
Shane-----	20-40	Soft	Low	High	Low
Barkof-----	20-40	Soft	Moderate	High	Moderate
Gerber-----	>60	---	Low	High	Low
211F:					
Cabbart-----	10-20	Soft	Moderate	High	Low
Yawdim-----	10-20	Soft	Low	High	Low
Rock outcrop----					
212F:					
Cabbart-----	10-20	Soft	Moderate	High	Low
Hillon-----	>60	---	Moderate	High	Low
221E:					
Hillon-----	>60	---	Moderate	High	Low
Kevin-----	>60	---	Moderate	High	Low
222D:					
Hillon-----	>60	---	Moderate	High	Low
Delpoint-----	20-40	Soft	Moderate	High	Low
223E:					
Hillon-----	>60	---	Moderate	High	Low
Fleak-----	10-20	Soft	Low	Moderate	Low
224E:					
Hillon-----	>60	---	Moderate	High	Low
Joplin-----	>60	---	Moderate	High	Low
227F:					
Hillon-----	>60	---	Moderate	High	Low
Fleak-----	10-20	Soft	Low	Moderate	Low
Rock outcrop----					
229E:					
Hillon-----	>60	---	Moderate	High	Low
Lambeth-----	>60	---	Moderate	High	Low

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential	Risk of corrosion	
	Depth	Hardness	frost action	Uncoated steel	Concrete
	In				
232A:					
Acel-----	>60	---	Low	High	Low
251C:					
Bascovy-----	20-40	Soft	Low	High	High
Neldore-----	10-20	Soft	Low	High	Moderate
251E:					
Bascovy-----	20-40	Soft	Low	High	High
Neldore-----	10-20	Soft	Low	High	Moderate
252C:					
Bascovy-----	20-40	Soft	Low	High	High
Marvan-----	>60	---	Low	High	Moderate
261B:					
Absher-----	>60	---	Low	High	Moderate
Nobe-----	>60	---	Low	High	High
263A:					
Toston-----	>60	---	High	High	Moderate
264A:					
Toston-----	>60	---	High	High	Moderate
Nobe-----	>60	---	Low	High	High
265B:					
Absher-----	>60	---	Low	High	Moderate
Gerdum-----	>60	---	Low	High	Moderate
272C:					
Attewan-----	>60	---	Moderate	High	Low
Tinsley-----	>60	---	Low	High	Low
301A:					
Marvan-----	>60	---	Low	High	Moderate
Vanda-----	>60	---	Low	High	Moderate
301C:					
Marvan-----	>60	---	Low	High	Moderate
Vanda-----	>60	---	Low	High	Moderate
303A:					
Flatcreek-----	>60	---	Moderate	High	Moderate
Nobe-----	>60	---	Low	High	High
305A:					
Marvan-----	>60	---	Low	High	Moderate
Nobe-----	>60	---	Low	High	High

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential	Risk of corrosion	
	Depth	Hardness	frost action	Uncoated steel	Concrete
	In				
311B:					
Ferd-----	>60	---	Low	High	Low
Creed-----	>60	---	Low	High	Moderate
Gerdrum-----	>60	---	Low	High	Moderate
311C:					
Ferd-----	>60	---	Low	High	Low
Creed-----	>60	---	Low	High	Moderate
Gerdrum-----	>60	---	Low	High	Moderate
323B:					
Sagedale-----	>60	---	Low	High	Low
323C:					
Sagedale-----	>60	---	Low	High	Low
324B:					
Marcott-----	>60	---	High	High	Low
331B:					
Phillips-----	>60	---	Low	High	Low
Elloam-----	>60	---	Low	High	High
331C:					
Phillips-----	>60	---	Low	High	Low
Elloam-----	>60	---	Low	High	High
334B:					
Phillips-----	>60	---	Low	High	Low
Kevin-----	>60	---	Moderate	High	Low
341B:					
Linnet-----	>60	---	Low	High	Low
Marias-----	>60	---	Low	High	Low
351B:					
Kenilworth-----	>60	---	Moderate	High	Low
Fortbenton-----	>60	---	Moderate	High	Low
361B:					
Fortbenton-----	>60	---	Moderate	High	Low
362C:					
Chinook-----	>60	---	Moderate	High	Low
Yetull-----	>60	---	Low	High	Low
363B:					
Cozberg-----	>60	---	Moderate	High	Low
Chinook-----	>60	---	Moderate	High	Low

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
363C:					
Chinook-----	>60	---	Moderate	High	Low
Lihen-----	>60	---	Low	High	Low
364B:					
Chinook-----	>60	---	Moderate	High	Low
364C:					
Chinook-----	>60	---	Moderate	High	Low
365B:					
Fortbenton-----	>60	---	Moderate	High	Low
Chinook-----	>60	---	Moderate	High	Low
368C:					
Fortbenton-----	>60	---	Moderate	High	Low
Hillon-----	>60	---	Moderate	High	Low
372C:					
Evanston-----	>60	---	Moderate	High	Low
Yamacall-----	>60	---	Moderate	High	Low
375B:					
Evanston-----	>60	---	Moderate	High	Low
Lonna-----	>60	---	Moderate	High	Low
377B:					
Evanston-----	>60	---	Moderate	High	Low
Degrand-----	>60	---	Moderate	High	Low
381B:					
Ethridge-----	>60	---	Low	High	Low
385B:					
Ethridge-----	>60	---	Low	High	Low
Kobase-----	>60	---	Low	High	Low
386B:					
Ethridge-----	>60	---	Low	High	Low
Evanston-----	>60	---	Moderate	High	Low
388A:					
Ethridge-----	>60	---	Low	High	Low
Lonna-----	>60	---	Moderate	High	Low
402A:					
Gerdum-----	>60	---	Low	High	Moderate
Absher-----	>60	---	Low	High	Moderate
Creed-----	>60	---	Low	High	Moderate

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
410: Rock outcrop----					
Fleak-----	10-20	Soft	Low	Moderate	Low
411D: Farnuf-----	>60	---	Moderate	High	Low
Reeder-----	20-40	Soft	Moderate	High	Low
411E: Reeder-----	20-40	Soft	Moderate	High	Low
Farnuf-----	>60	---	Moderate	High	Low
421C: Joplin-----	>60	---	Moderate	High	Low
Hillon-----	>60	---	Moderate	High	Low
422C: Marmarth-----	20-40	Soft	Moderate	High	Low
441C: Kevin-----	>60	---	Moderate	High	Low
Hillon-----	>60	---	Moderate	High	Low
442C: Kevin-----	>60	---	Moderate	High	Low
Elloam-----	>60	---	Low	High	High
444D: Kevin-----	>60	---	Moderate	High	Low
Scobey-----	>60	---	Low	High	Low
451C: Turner-----	>60	---	Moderate	High	Low
Beaverton-----	>60	---	Moderate	High	Low
Beaverton-----	>60	---	Moderate	High	Low
460: Laceycreek-----	>60	---	Moderate	High	Low
471B: Marias-----	>60	---	Low	High	Low
Kobase-----	>60	---	Low	High	Low
481A: Bigsag-----	>60	---	Moderate	High	High
493A: Enbar-----	>60	---	High	High	Low
Straw-----	>60	---	Moderate	High	Low
Eagleton-----	>60	---	High	High	Low

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential	Risk of corrosion	
	Depth	Hardness	frost action	Uncoated steel	Concrete
	In				
503B:					
Telstad-----	>60	---	Low	High	Low
Joplin-----	>60	---	Moderate	High	Low
503C:					
Telstad-----	>60	---	Low	High	Low
Joplin-----	>60	---	Moderate	High	Low
510:					
Rock outcrop----					
Belain-----	20-40	Hard	Moderate	High	Low
511A:					
Martinsdale----	>60	---	Moderate	High	Moderate
Turner-----	>60	---	Moderate	High	Low
511C:					
Martinsdale----	>60	---	Moderate	High	Moderate
512C:					
Martinsdale----	>60	---	Moderate	High	Moderate
521B:					
Thoeny-----	>60	---	Low	High	Moderate
Elloam-----	>60	---	Low	High	High
Absher-----	>60	---	Low	High	Moderate
530F:					
Warwood-----	>60	---	Moderate	High	Low
531A:					
Sweetgrass-----	>60	---	Moderate	High	Low
Beaverton-----	>60	---	Moderate	High	Low
531C:					
Sweetgrass-----	>60	---	Moderate	High	Low
Beaverton-----	>60	---	Moderate	High	Low
Beaverton-----	>60	---	Moderate	High	Low
550F:					
Libeg-----	>60	---	Moderate	Moderate	Moderate
Arrowpeak-----	10-20	Hard	Moderate	High	Low
Elkner-----	>60	---	Moderate	Moderate	Moderate
551B:					
Lonesome-----	>60	---	Moderate	High	Low
560F:					
Elve-----	>60	---	Moderate	Moderate	Moderate
Rock outcrop----					

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
561B:					
Scobey-----	>60	---	Low	High	Low
Kevin-----	>60	---	Moderate	High	Low
561C:					
Scobey-----	>60	---	Low	High	Low
Kevin-----	>60	---	Moderate	High	Low
562B:					
Scobey-----	>60	---	Low	High	Low
Linnet-----	>60	---	Low	High	Low
563A:					
Fortbenton-----	>60	---	Moderate	High	Low
Scobey-----	>60	---	Low	High	Low
580F:					
Garlet-----	>60	---	Moderate	Moderate	Moderate
Elkner-----	>60	---	Moderate	Moderate	Moderate
601A:					
Havre-----	>60	---	Moderate	High	Low
Glendive-----	>60	---	Moderate	High	Low
602A:					
Havre-----	>60	---	Moderate	High	Low
603A:					
Havre-----	>60	---	Moderate	High	Low
Glendive-----	>60	---	Low	High	Low
605C:					
Yamacall-----	>60	---	Moderate	High	Low
Havre-----	>60	---	Moderate	High	Low
621E:					
Sagedale-----	>60	---	Low	High	Low
Wayden-----	10-20	Soft	Low	High	Low
621F:					
Wayden-----	10-20	Soft	Low	High	Low
Sagedale-----	>60	---	Low	High	Low
623F:					
Linwell-----	>60	---	Low	High	Low
Winifred-----	20-40	Soft	Low	High	Low
630E:					
Crow-----	>60	---	Moderate	Moderate	Moderate
Lubrecht-----	20-40	Soft	Moderate	Moderate	Moderate

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential	Risk of corrosion	
	Depth	Hardness	frost action	Uncoated	Concrete
				steel	
	In				
641F:					
Norbert-----	10-20	Soft	Low	High	Low
Barkof-----	20-40	Soft	Moderate	High	Moderate
650D:					
Laceycreek-----	>60	---	Moderate	High	Low
Ambrant-----	>60	---	Moderate	Moderate	Moderate
650F:					
Laceycreek-----	>60	---	Moderate	High	Low
Eaglecreek-----	20-40	Hard	Moderate	High	Low
653F:					
Fleak-----	10-20	Soft	Low	Moderate	Low
Twilight-----	20-40	Soft	Moderate	High	Low
Yetull-----	>60	---	Low	High	Low
654F:					
Fleak-----	10-20	Soft	Low	Moderate	Low
Twilight-----	20-40	Soft	Moderate	High	Low
Rock outcrop----					
661E:					
Twilight-----	20-40	Soft	Moderate	High	Low
Fleak-----	10-20	Soft	Low	Moderate	Low
671B:					
Bearpaw-----	>60	---	Moderate	High	Moderate
Vida-----	>60	---	Moderate	High	Low
671C:					
Bearpaw-----	>60	---	Moderate	High	Moderate
Vida-----	>60	---	Moderate	High	Low
673A:					
Bearpaw-----	>60	---	Moderate	High	Moderate
Daglum-----	>60	---	Moderate	High	Moderate
674B:					
Bearpaw-----	>60	---	Moderate	High	Moderate
Waltham-----	>60	---	Low	High	High
680F:					
Winkler-----	>60	---	Moderate	Moderate	Moderate
Ambrant-----	>60	---	Moderate	Moderate	Moderate
Winkler-----	>60	---	Moderate	Moderate	Moderate

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential	Risk of corrosion	
	Depth	Hardness	frost action	Uncoated steel	Concrete
	In				
681C:					
Gerber-----	>60	---	Low	High	Low
691D:					
Vida-----	>60	---	Moderate	High	Low
Williams-----	>60	---	Moderate	High	Low
692D:					
Vida-----	>60	---	Moderate	High	Low
Bearpaw-----	>60	---	Moderate	High	Moderate
693C:					
Vida-----	>60	---	Moderate	High	Low
Bearpaw-----	>60	---	Moderate	High	Moderate
Nishon-----	>60	---	Moderate	High	Low
701E:					
Work-----	>60	---	Moderate	High	Low
Absarokee-----	20-40	Soft	Low	High	Low
702E:					
Work-----	>60	---	Low	High	Low
Absarokee-----	20-40	Soft	Low	High	Low
721E:					
Zahill-----	>60	---	Moderate	High	Low
Vida-----	>60	---	Moderate	High	Low
722F:					
Zahill-----	>60	---	Moderate	High	Low
Sagedale-----	>60	---	Low	High	Low
Wayden-----	10-20	Soft	Low	High	Low
723F:					
Zahill-----	>60	---	Moderate	High	Low
Cabba-----	10-20	Soft	Moderate	High	Low
731F:					
Yetull-----	>60	---	Low	High	Low
Dune land-----					
741B:					
Shambo-----	>60	---	Moderate	High	Low
Straw-----	>60	---	Moderate	High	Low
745F:					
Shambo-----	>60	---	Moderate	High	Low
Amor-----	20-40	Soft	Moderate	High	Moderate

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
			In		
745F: (cont.)					
Cabba-----	10-20	Soft	Moderate	High	Low
761C:					
Hedoes-----	>60	---	Moderate	High	Low
Belain-----	20-40	Hard	Moderate	High	Low
761E:					
Hedoes-----	>60	---	Moderate	High	Low
Belain-----	20-40	Hard	Moderate	High	Low
793B:					
Yamacall-----	>60	---	Moderate	High	Low
793C:					
Yamacall-----	>60	---	Moderate	High	Low
795C:					
Yamacall-----	>60	---	Moderate	High	Low
Benz-----	>60	---	Moderate	High	Low
795D:					
Yamacall-----	>60	---	Moderate	High	Low
Benz-----	>60	---	Moderate	High	Low
801B:					
Williams-----	>60	---	Moderate	High	Low
Vida-----	>60	---	Moderate	High	Low
801C:					
Williams-----	>60	---	Moderate	High	Low
Vida-----	>60	---	Moderate	High	Low
828A:					
Savage-----	>60	---	Low	High	Low
842A:					
Savage-----	>60	---	Low	High	Moderate
Daglum-----	>60	---	Low	High	Moderate
863E:					
Work-----	>60	---	Low	High	Low
Roy-----	>60	---	Moderate	High	Low
871B:					
Tamaneen-----	>60	---	Moderate	High	Low
871C:					
Tamaneen-----	>60	---	Moderate	High	Low
883F:					
Perma-----	>60	---	Moderate	Moderate	Low
Whitlash-----	10-20	Hard	Moderate	High	Low

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
892F:					
Whitlash-----	10-20	Hard	Moderate	High	Low
Belain-----	20-40	Hard	Moderate	High	Low
Rock outcrop----					
895F:					
Belain-----	20-40	Hard	Moderate	High	Low
Whitlash-----	10-20	Hard	Moderate	High	Low
Hedoes-----	>60	---	Moderate	High	Low
896E:					
Belain-----	20-40	Hard	Moderate	High	Low
Whitlash-----	10-20	Hard	Moderate	High	Low
Rock outcrop----					
911F:					
Belain-----	20-40	Hard	Moderate	High	Low
Whitlash-----	10-20	Hard	Moderate	High	Low
Hedoes-----	>60	---	Moderate	High	Low
916C:					
Belain-----	20-40	Hard	Moderate	High	Low
Hedoes-----	>60	---	Moderate	High	Low
925F:					
Sunburst-----	>60	---	Low	High	Low
Lambeth-----	>60	---	Moderate	High	Low
941D:					
Busby-----	>60	---	Moderate	High	Low
Twilight-----	20-40	Soft	Moderate	High	Low
943C:					
Tally-----	>60	---	Moderate	High	Low
943E:					
Tally-----	>60	---	Moderate	High	Low
Vebar-----	20-40	Soft	Moderate	Moderate	Low
943F:					
Tally-----	>60	---	Moderate	High	Low
Cohagen-----	10-20	Soft	Moderate	High	Low
965F:					
Cahba-----	10-20	Soft	Moderate	High	Low
Macar-----	>60	---	Moderate	High	Low

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
971F:					
Neldore-----	10-20	Soft	Low	High	Moderate
Bascovy-----	20-40	Soft	Low	High	High
972F:					
Neldore-----	10-20	Soft	Low	High	Moderate
Rock outcrop----					
974F:					
Neldore-----	10-20	Soft	Low	High	Moderate
Hillon-----	>60	---	Moderate	High	Low

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Glossary

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvial fan. A body of alluvium, with overflow of water and debris flow deposits, whose surface forms a segment of a cone that radiates downslope from the point where the stream emerges from a narrow valley onto a less sloping surface. Source uplands range in relief and areal extent from mountains to gullied terrains on hill slopes.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Animal-unit-month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillite. Weakly metamorphosed mudstone or shale.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in

inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3.75
Low	3.75 to 5.0
Moderate	5.0 to 7.5
High	more than 7.5

Avalanche chute. The track or path formed by an avalanche.

Back slope. The geomorphic component that forms the steepest inclined surface and principal element of many hill slopes. Back slopes in profile are commonly steep and linear and descend to a foot slope. In terms of gradational process, back slopes are erosional forms produced mainly by mass wasting and running water.

Badland. Steep or very steep, commonly nonstony, barren land dissected by many intermittent drainage channels. Badland is most common in semiarid and arid regions where streams are entrenched in soft geologic material. Local relief generally ranges from 25 to 500 feet. Runoff potential is very high, and geologic erosion is active.

Basal area. The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-floored plain. An extensive nearly level to gently rolling or moderately sloping area that is underlain by hard bedrock and has a slope of 0 to 8 percent.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Blowout. A shallow depression from which all or most of the soil material has been removed by the wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Board foot. A unit of measure of the wood in lumber, logs, or trees. The amount of wood in a board 1 foot wide, 1 foot long, and 1 inch thick before finishing.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks. The steep or very steep broken land at the border of an upland summit that is dissected by ravines.

Breast height. An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management. Use of mechanical, chemical, or biological methods to reduce or eliminate competition from woody vegetation and thus to allow understory grasses and forbs to recover or to make conditions favorable for reseeding. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Cable yarding. A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, a felled tree generally is reeled in while one end is lifted or the entire log is suspended.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Caliche. A more or less cemented deposit of calcium carbonate in soils of warm-temperate, subhumid to arid areas. Caliche occurs as soft, thin layers in the soil or as hard, thick beds just beneath the solum, or it is exposed at the surface by erosion.

California bearing ratio (CBR). The load-supporting capacity of a soil as compared to that of standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

Channeled. Refers to a drainage area in which natural meandering or repeated branching and convergence of a streambed have created deeply incised cuts, either active or abandoned, in alluvial material.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation by use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that loosen the subsoil and bring clods to the surface. A form of emergency tillage to control soil blowing.

Cirque. A semicircular, concave, bowl-like area that has steep faces primarily resulting from erosive activity of a mountain glacier.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clayey soil. Silty clay, sandy clay, or clay.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Clearcut. A method of forest harvesting that removes the entire stand of trees in one cutting. Reproduction is achieved artificially or by natural seeding from the adjacent stands.

Climax plant community. The plant community on a given site that will be established if present environmental conditions continue to prevail and the site is properly managed.

Closed depression. A low area completely surrounded by higher ground and having no natural outlet.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that is 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material is 35 to 60 percent cobbles, and extremely cobbly soil material is more than 60 percent cobbles.

Codominant trees. Trees whose crowns form the general level of the forest canopy and that receive full light from above but comparatively little from the sides.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Commercial forest. Forest land capable of producing 20 cubic feet or more per acre per year at the culmination of mean annual increment.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conglomerate. A coarse grained, clastic rock composed of rounded to subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. Any tillage and planting system in which a cover of crop residue is maintained on at least 30 percent of the soil surface after planting in order to reduce the hazard of water erosion; in areas where soil blowing is the primary concern, a system that maintains a cover of at least 1,000 pounds of flat residue of small grain or the equivalent during the critical erosion period.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—Readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—Adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Consolidated sandstone. Sandstone that disperses within a few hours when fragments are placed in water. The fragments are extremely hard or very

hard when dry, are not easily crushed, and cannot be textured by the usual field method.

Consolidated shale. Shale that disperses within a few hours when fragments are placed in water. The fragments are extremely hard or very hard when dry and are not easily crushed.

Contour stripcropping (or contour farming).

Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat). Fecal material deposited in water by aquatic organisms.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Culmination of mean annual increment (CMAI).

The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called culmination of mean annual increment.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deep soil. A soil that is 40 to 60 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Dip slope. A slope of the land surface, roughly determined by and approximately conforming with the dip of underlying bedded rock.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming. A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit the use of a full stripcropping pattern.

Dominant trees. Trees whose crowns form the general level of the forest canopy and that receive full light from above and from the sides.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—These soils have very high and high hydraulic conductivity and a low water-holding capacity. They are not suited to crop production unless irrigated.

Somewhat excessively drained.—These soils have high hydraulic conductivity and a low water-holding capacity. Without irrigation, only a narrow range of crops can be grown and yields are low.

Well drained.—These soils have an intermediate water-holding capacity. They retain optimum amounts of moisture, but they are not wet close enough to the surface or long enough during the growing season to adversely affect yields.

Moderately well drained.—These soils are wet close enough to the surface or long enough that planting or harvesting operations or yields of some field crops are adversely affected unless a drainage system is installed. Moderately well drained soils commonly have a layer with low

hydraulic conductivity, a wet layer relatively high in the profile, additions of water by seepage, or some combination of these.

Somewhat poorly drained.—These soils are wet close enough to the surface or long enough that planting or harvesting operations or crop growth is markedly restricted unless a drainage system is installed. Somewhat poorly drained soils commonly have a layer with low hydraulic conductivity, a wet layer high in the profile, additions of water through seepage, or a combination of these.

Poorly drained.—These soils commonly are so wet at or near the surface during a considerable part of the year that field crops cannot be grown under natural conditions. Poorly drained conditions are caused by a saturated zone, a layer with low hydraulic conductivity, seepage, or a combination of these.

Very poorly drained.—These soils are wet to the surface most of the time. The wetness prevents the growth of important crops (except rice) unless a drainage system is installed.

Drainage, surface. Runoff, or surface flow of water, from an area.

Drainageway. An area of ground at a lower elevation than the surrounding ground and in which water collects and is drained to a closed depression or lake or to a drainageway at a lower elevation. A drainageway may or may not have distinctly incised channels at its upper reaches or throughout its course.

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Duff. A term used to identify a generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Dune. A mound, ridge, or hill of loose, windblown granular material (generally sand), either bare or covered with vegetation.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, for example, fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. The term is more often applied to cliffs resulting from differential erosion.

Esker. A long, narrow, sinuous, steep-sided ridge composed of irregularly stratified sand and gravel that were deposited by a subsurface stream flowing between ice walls or through ice tunnels of a retreating glacier and that were left behind when the ice melted. Eskers range from less than a mile to more than 100 miles in length and from 10 to 100 feet in height.

Even aged. Refers to a stand of trees in which only small differences in age occur between individual trees. A range of 20 years is allowed.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Excess lime (in tables). Excess carbonates in the soil that restrict the growth of some plants.

Excess salts (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Excess sodium (in tables). Excess exchangeable sodium in the soil. The resulting poor physical properties restrict the growth of plants.

Excess sulfur (in tables). Excessive amount of sulfur in the soil. The sulfur causes extreme acidity if the soil is drained, and the growth of most plants is restricted.

Extrusive rock. Igneous rock derived from deep-seated molten matter (magma) emplaced on the earth's surface.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the oven-dry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity*, *normal moisture capacity*, or *capillary capacity*.

Fine textured soil. Sandy clay, silty clay, or clay.

Firebreak. An area cleared of flammable material to stop or help control creeping or running fires. A firebreak also serves as a line from which to work and to facilitate the movement of fire fighters and equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that is, by volume, 15 to 35 percent flagstones. Very flaggy soil material is 35 to 60 percent flagstones, and extremely flaggy soil material is more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to inundation under flood-stage conditions unless protected artificially. It is usually a constructional landform built of sediment deposited during overflow and lateral migration of the stream.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Foothills. A region of relatively low, rounded hills at the base of a mountain range.

Foot slope. The geomorphic component that forms the inner, gently inclined surface at the base of a hill slope. The surface profile is dominantly concave. In terms of gradational processes, a foot slope is a transition zone between an upslope site of erosion (back slope) and a downslope site of deposition (toe slope).

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragile (in tables). A soil that is easily damaged by use or disturbance.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Giant ripple mark. The undulating surface sculpture produced in noncoherent granular materials by currents of water and by the agitation of water in wave action during the draining of large glacial lakes, such as Glacial Lake Missoula.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciated uplands. Land areas that were previously covered by continental or alpine glaciers and that are at a higher elevation than the flood plain.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage. A gullied map unit is one that has numerous gullies.

Gypsum. A mineral consisting of hydrous calcium sulfate.

Habitat type. An aggregation of all land areas capable of producing similar climax plant communities.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Head out. To form a flower head.

Heavy metal. Inorganic substances that are solid at ordinary temperatures and are not soluble in water. They form oxides and hydroxides that are basic. Examples are copper, iron, cadmium, zinc, manganese, lead, and arsenic.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 8 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons of mineral soil are as follows:
O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the number 2 precedes the letter C.

Cr horizon.—Sedimentary beds of consolidated sandstone and semiconsolidated and

consolidated shale. Generally, roots can penetrate this horizon only along fracture planes.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasesers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasesers commonly are the shorter plants and are less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:
Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.
Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.
Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Kame. A moundlike hill of glacial drift, composed chiefly of stratified sand and gravel.

Kame terrace. A terracelike ridge consisting of stratified sand and gravel that were deposited by a meltwater stream flowing between a melting glacier and a higher valley wall or lateral moraine and that remained after the disappearance of the ice. It is commonly pitted with kettles and has an irregular ice-contact slope.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Lake plain. A surface marking the floor of an extinct lake, filled in by well sorted, stratified sediments.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Lateral moraine. A ridgelike moraine carried on and deposited at the side margin of a valley glacier. It is composed chiefly of rock fragments derived from the valley walls by glacial abrasion and plucking or by mass wasting.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loamy soil. Coarse sandy loam, sandy loam, fine sandy loam, very fine sandy loam, loam, silt loam, silt, clay loam, sandy clay loam, or silty clay loam.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by the wind.

Low-residue crops. Crops such as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Low strength. The soil is not strong enough to support loads.

Marl. An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal amounts.

Mean annual increment (MAI). The average annual increase in volume of a tree during the entire life of the tree.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Merchantable trees. Trees that are of sufficient size to be economically processed into wood products.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Microhigh. An area that is 2 to 12 inches higher than the adjacent microlow.

Microlow. An area that is 2 to 12 inches lower than the adjacent microhigh.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Miscellaneous water. A sewage lagoon, an industrial waste pit, a fish hatchery, or a similar water area.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately deep soil. A soil that is 20 to 40 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Moraine. An accumulation of glacial drift in a topographic landform of its own, resulting chiefly from the direct action of glacial ice. Some types are lateral, recessional, and terminal.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of limited summit area and generally having steep sides (slopes greater than 25 percent) and considerable bare-rock surface. A mountain can occur as a single, isolated mass or in a group forming a chain or range. Mountains are primarily formed by deep-seated earth movements or volcanic action and secondarily by differential erosion.

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Mudstone. Sedimentary rock formed by induration of silt and clay in approximately equal amounts.

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Observed rooting depth. Depth to which roots have been observed to penetrate.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. An extensive area of glaciofluvial material that was deposited by meltwater streams.

Overstory. The trees in a forest that form the upper crown cover.

Oxbow. The horseshoe-shaped channel of a former meander, remaining after the stream formed a cutoff across a narrow meander neck.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan*, *fragipan*, *claypan*, *plowpan*, and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square

meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percolates slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Playa. The generally dry and nearly level lake plain that occupies the lowest parts of closed depressional areas, such as those on intermontane basin floors. Temporary flooding occurs primarily in response to precipitation and runoff.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability or an impermeable layer near the surface, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth).

Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. The application of fire to land under such conditions of weather, soil moisture, and time of day as presumably will result in the intensity of heat and spread required to accomplish specific forest management, wildlife, grazing, or fire hazard reduction purposes.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Quartzite, metamorphic. Rock consisting mainly of quartz that formed through recrystallization of quartz-rich sandstone or chert.

Quartzite, sedimentary. Very hard but unmetamorphosed sandstone consisting chiefly of quartz grains.

Range condition. The present composition of the plant community on a range site in relation to the potential natural plant community for that site. Range condition is expressed as excellent, good, fair, or poor on the basis of how much the present plant community has departed from the potential.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Range site. An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an

association of species that differ from those on other range sites in kind or proportion of species or total production.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Recessional moraine. A moraine formed during a temporary but significant halt in the retreat of a glacier.

Red beds. Sedimentary strata mainly red in color and composed largely of sandstone and shale.

Regeneration. The new growth of a natural plant community, developing from seed.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relict stream terrace. One of a series of platforms in or adjacent to a stream valley that formed prior to the current stream system.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Riser. The relatively short, steeply sloping area below a terrace tread that grades to a lower terrace tread or base level.

Riverwash. Unstable areas of sandy, silty, clayey, or gravelly sediments. These areas are flooded, washed, and reworked by rivers so frequently that they support little or no vegetation.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rock outcrop. Exposures of bare bedrock other than lava flows and rock-lined pits.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Rubble land. Areas that have more than 90 percent of the surface covered by stones or boulders. Voids contain no soil material and virtually no vegetation other than lichens. The areas commonly are at the base of mountain slopes, but some are on mountain slopes as deposits of cobbles, stones, and boulders left by Pleistocene glaciation or by periglacial phenomena.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs the growth of plants. A saline soil does not contain excess exchangeable sodium.

Salinity. The electrical conductivity of a saline soil. It is expressed, in millimhos per centimeter, as follows:

Nonsaline	0 to 4
Slightly saline	4 to 8
Moderately saline	8 to 16
Strongly saline	more than 16

Salty water (in tables). Water that is too salty for consumption by livestock.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sandy soil. Sand or loamy sand.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Sawlogs. Logs of suitable size and quality for the production of lumber.

Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to

increase water absorption or to provide a more tillable soil.

Scribner's log rule. A method of estimating the number of board feet that can be cut from a log of a given diameter and length.

Sedimentary plain. An extensive nearly level to gently rolling or moderately sloping area that is underlain by sedimentary bedrock and that has a slope of 0 to 8 percent.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Sedimentary uplands. Land areas of bedrock formed from water- or wind-deposited sediments. They are higher on the landscape than the flood plain.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Semiconsolidated sedimentary beds. Soft geologic sediments that disperse when fragments are placed in water. The fragments are hard or very hard when dry. Determining the texture by the usual field method is difficult.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Shallow soil. A soil that is 10 to 20 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shelterwood system. A forest management system requiring the removal of a stand in a series of cuts so that regeneration occurs under a partial canopy. After regeneration, a final cut removes the shelterwood and allows the stand to develop in the open as an even-aged stand. The system is well suited to sites where shelter is needed for regeneration, and it can aid regeneration of the more intolerant tree species in a stand.

Shoulder slope. The uppermost inclined surface at the top of a hillside. It is the transition zone from the back slope to the summit of a hill or mountain. The surface is dominantly convex in profile and erosional in origin.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the county.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site class. A grouping of site indexes into five to seven production capability levels. Each level can be represented by a site curve.

Site curve (50-year). A set of related curves on a graph that shows the average height of dominant or dominant and codominant trees for the range of ages on soils that differ in productivity. Each level is represented by a curve. The basis of the curves is the height of dominant or dominant and codominant trees that are 50 years old or are 50 years old at breast height.

Site curve (100-year). A set of related curves on a graph that shows the average height of dominant or dominant and codominant trees for a range of ages on soils that differ in productivity. Each level is represented by a curve. The basis of the curves is the height of dominant or dominant and codominant trees that are 100 years old or are 100 years old at breast height.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant or dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Skid trails. Pathways along which logs are dragged to a common site for loading onto a logging truck.

Slash. The branches, bark, treetops, reject logs, and broken or uprooted trees left on the ground after logging.

Slickens. Accumulations of fine textured material, such as material separated in placer-mine and ore-mill operations. Slickens from ore mills commonly consist of freshly ground rock that has undergone chemical treatment during the milling process.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil generally is loamy or clayey, is slippery when wet, and is low in productivity.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey the following slope classes are recognized:

Nearly level	0 to 2 percent
Gently sloping	2 to 4 percent
Moderately sloping	4 to 8 percent
Strongly sloping	8 to 15 percent
Moderately steep	15 to 25 percent
Steep	25 to 45 percent
Very steep	more than 45 percent

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodic (alkali) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^+ to $\text{Ca}^{++} + \text{Mg}^{++}$. The degrees of sodicity and their respective ratios are:

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Species. A single, distinct kind of plant or animal having certain distinguishing characteristics.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Strath terrace. A surface cut formed by the erosion of hard or semiconsolidated bedrock and thinly mantled with stream deposits.

Stream channel. The hollow bed where a natural stream of surface water flows or may flow; the deepest or central part of the bed, formed by the main current and covered more or less continuously by water.

Stream terrace. One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel. It originally formed near the level of the stream and is the dissected remnants of an abandoned flood plain, streambed, or valley floor that were produced during a former stage of erosion or deposition.

Strippcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to soil blowing and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are: *platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter or loosen a layer that is restrictive to roots.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Summit. A general term for the top, or highest level, of an upland feature, such as a hill or mountain. It commonly refers to a higher area that has a gentle slope and is flanked by steeper slopes.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Tailwater. The water directly downstream of a structure.

Talus. Rock fragments of any size or shape, commonly coarse and angular, derived from and lying at the base of a cliff or very steep rock slope. The accumulated mass of such loose, broken rock formed chiefly by falling, rolling, or sliding.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances. It commonly is a massive arcuate ridge or complex of ridges underlain by till and other types of drift.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). A layer of otherwise suitable soil material that is too thin for the specified use.

Till plain. An extensive nearly level to gently rolling or moderately sloping area that is underlain by or

consists of till and that has a slope of 0 to 8 percent.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill. Toe slopes are commonly gentle and linear in profile.

Too arid (in tables). The soil is dry most of the time, and vegetation is difficult to establish.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Toxicity (in tables). Excessive amount of toxic substances, such as sodium or sulfur, that severely hinder establishment of vegetation or severely restrict plant growth.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Trafficability. The degree to which a soil is capable of supporting vehicular traffic across a wide range in soil moisture conditions.

Tread. The relatively flat terrace surface that was cut or built by stream or wave action.

Tuff. A compacted deposit that is 50 percent or more volcanic ash and dust.

Understory. Any plants in a forest community that grow to a height of less than 5 feet.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley. An elongated depressional area primarily developed by stream action.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Very deep soil. A soil that is more than 60 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Very shallow soil. A soil that is less than 10 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Water-spreading. Diverting runoff from natural channels by means of a system of dams, dikes, or ditches and spreading it over relatively flat surfaces.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near

the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an oven-dry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The action of uprooting and tipping over trees by the wind.

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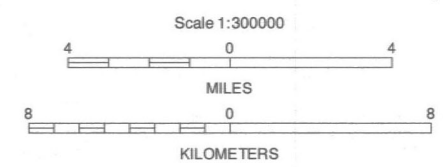
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SECTIONALIZED
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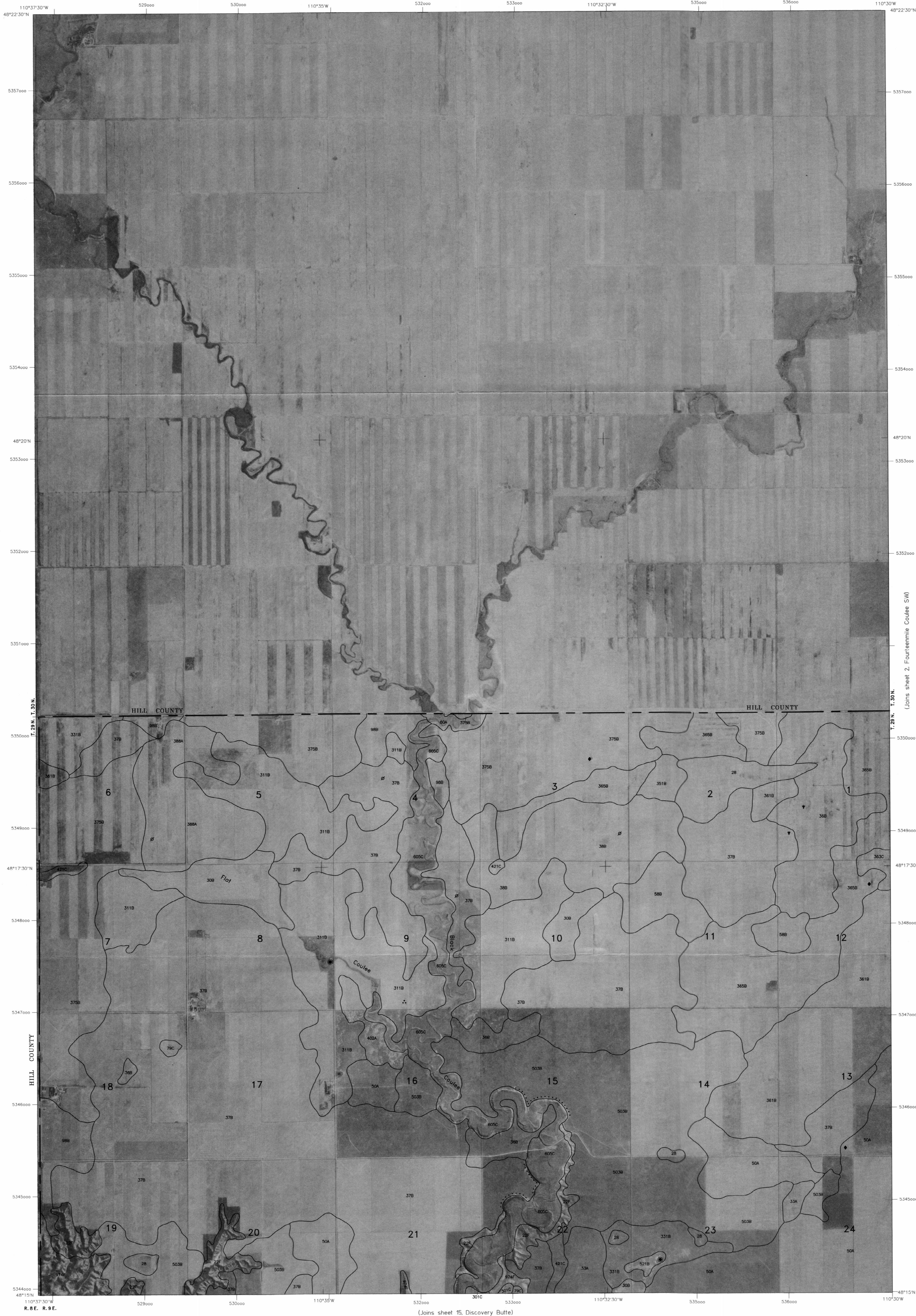
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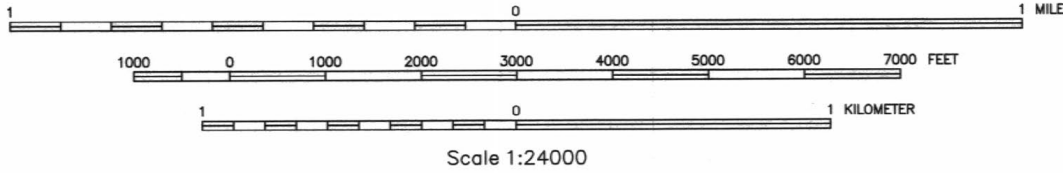
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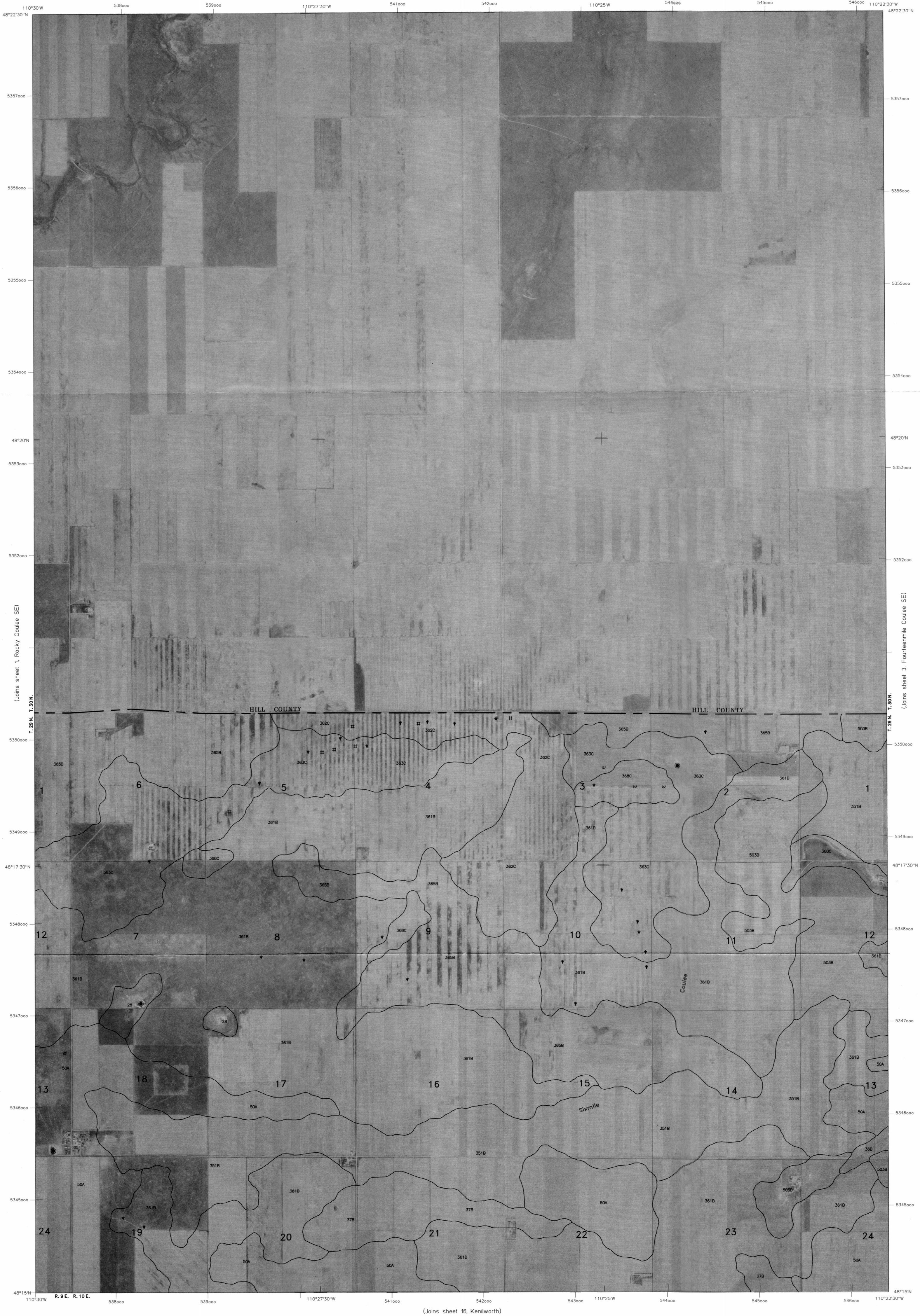
SYMBOL	NAME	SYMBOL	NAME	CULTURAL FEATURES	SPECIAL SYMBOLS FOR SOIL SURVEY
				BOUNDARIES	WATER FEATURES
				County or parish	MISCELLANEOUS WATER FEATURES
				Reservation (national forest or park, state forest or park, and large airport)	Marsh or swamp
				Field sheet matchline and neatline	Wet spot
				Public Land Survey System Section Boundary	
				ROAD EMBLEM & DESIGNATIONS	
				Federal	
				State	
				PITS	
				Gravel pit (5 acres or less)	
				Mine or quarry	
					SOIL DELINEATIONS AND SYMBOLS
					ESCARPMENTS
					Bedrock (points down slope)
					Other than bedrock (points down slope)
					SHORT STEEP SLOPE
					MISCELLANEOUS
					Blowout
					Clay spot
					Depression, closed
					Gravelly spot
					Rock outcrop (includes sandstone and shale)
					Saline spot
					Sandy spot
					Slide or slip (tips point upslope)
					Stony spot, very stony spot
					Bentonite deposit, exposed
					Saline seep < 10 acres
					Note: All special symbols are for areas of 2 acres or less unless otherwise noted.



This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.



Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum



UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

CHOUTEAU COUNTY AREA, MONTANA
FOURTEENMILE COULEE SE QUADRANGLE
SHEET NUMBER 3
7.5 MINUTE SERIES

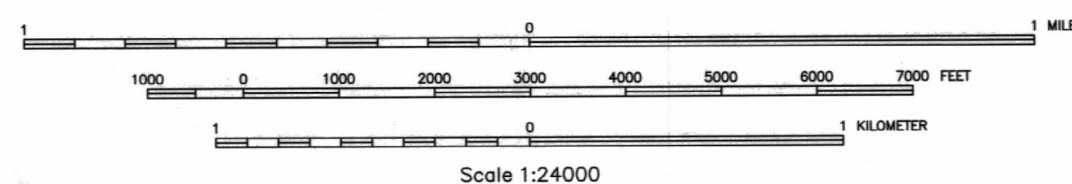


This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971–1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 3 OF 106
CHOUTEAU COUNTY AREA, MONTANA
FOURTEENMILE COULEE SE QUADRANGLE

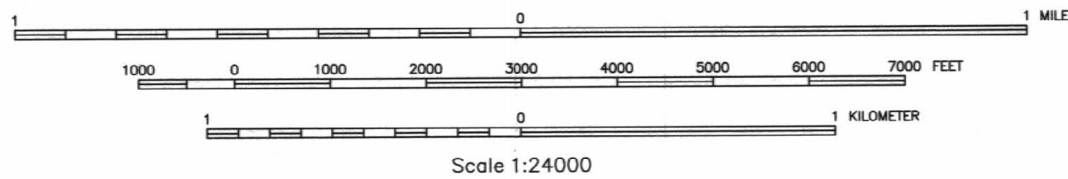
CHOUTEAU COUNTY AREA, MONTANA
LONESOME LAKE QUADRANGLE
SHEET NUMBER 4
7.5 MINUTE SERIES



Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 4 OF 106
CHOUTEAU COUNTY AREA, MONTANA
LONESOME LAKE QUADRANGLE

CHOUTEAU COUNTY AREA, MONTANA
BOX ELDER QUADRANGLE
SHEET NUMBER 5
7.5 MINUTE SERIES

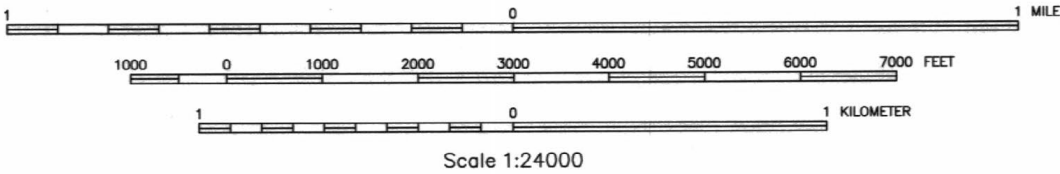


Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 5 OF 106
CHOUTEAU COUNTY AREA, MONTANA
BOX ELDER QUADRANGLE



This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.



Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 6 OF 106
CHOUTEAU COUNTY AREA, MONTANA
COWAN RESERVOIR QUADRANGLE



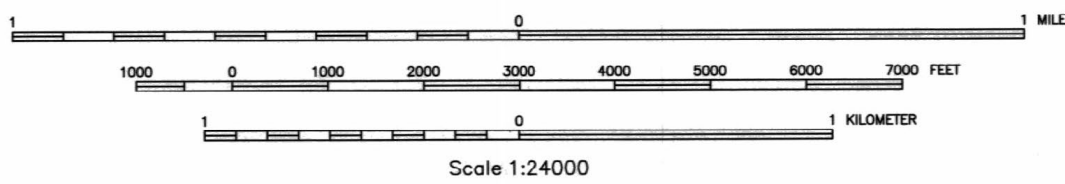
This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 7 OF 106
CHOUTEAU COUNTY AREA, MONTANA
ROCKY BOY QUADRANGLE



This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.



Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum



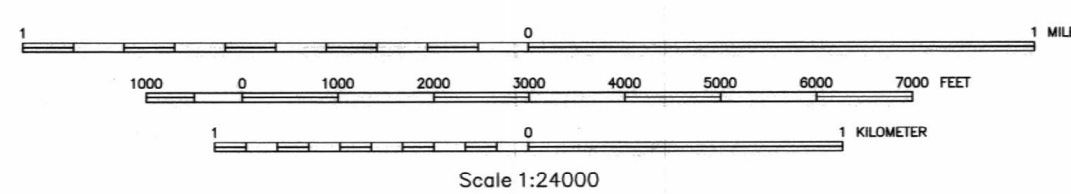
SHEET NUMBER 8 OF 106
CHOUTEAU COUNTY AREA, MONTANA
SOLLID SCHOOL QUADRANGLE

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

CHOUTEAU COUNTY AREA, MONTANA
KNEES NE QUADRANGLE
SHEET NUMBER 9
7.5 MINUTE SERIES



This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971–1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.



Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

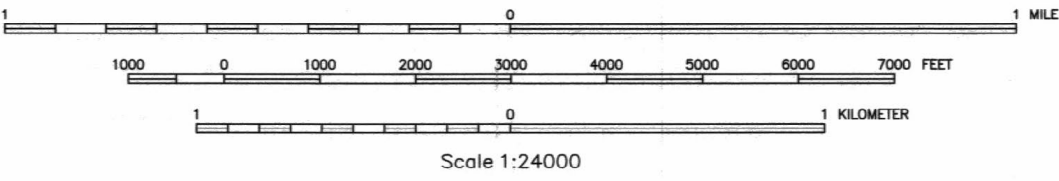
SHEET NUMBER 9 OF 106
CHOUTEAU COUNTY AREA, MONTANA
KNEES NE QUADRANGLE



This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.



This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971–1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.



Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

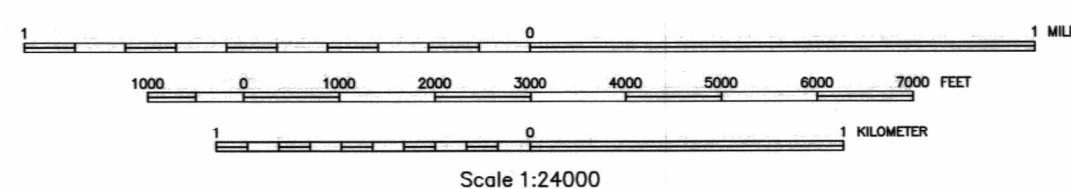


UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

CHOUTEAU COUNTY AREA, MONTANA
GOOSE BILL BUTTE NW QUADRANGLE
SHEET NUMBER 12
7.5 MINUTE SERIES



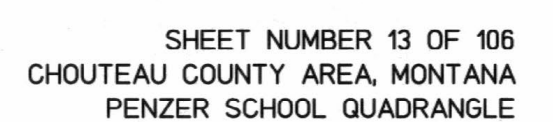
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Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection

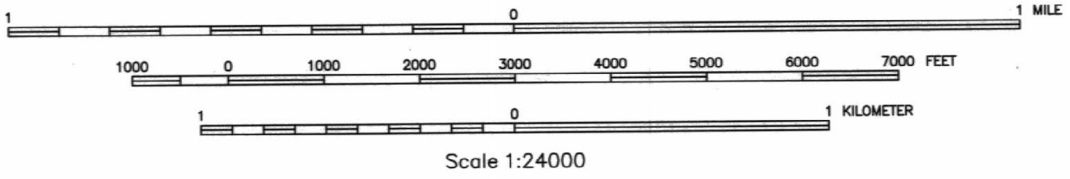
SHEET NUMBER 12 OF 106
CHOUTEAU COUNTY AREA, MONTANA
GOOSE BILL BUTTE NW QUADRANGLE

**CHOUTEAU COUNTY AREA, MONTANA
PENZER SCHOOL QUADRANGLE
SHEET NUMBER 13
7.5 MINUTE SERIES**





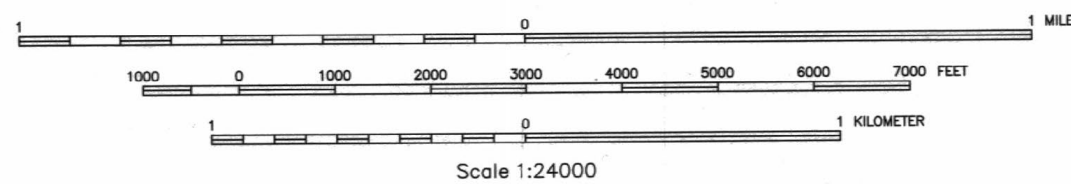
This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.



Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 14 OF 106
CHOUTEAU COUNTY AREA, MONTANA
DUTCH HENRY COULEE QUADRANGLE

CHOUTEAU COUNTY AREA, MONTANA
DISCOVERY BUTTE QUADRANGLE
SHEET NUMBER 15
7.5 MINUTE SERIES



Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 15 OF 106
CHOUTEAU COUNTY AREA, MONTANA
DISCOVERY BUTTE QUADRANGLE

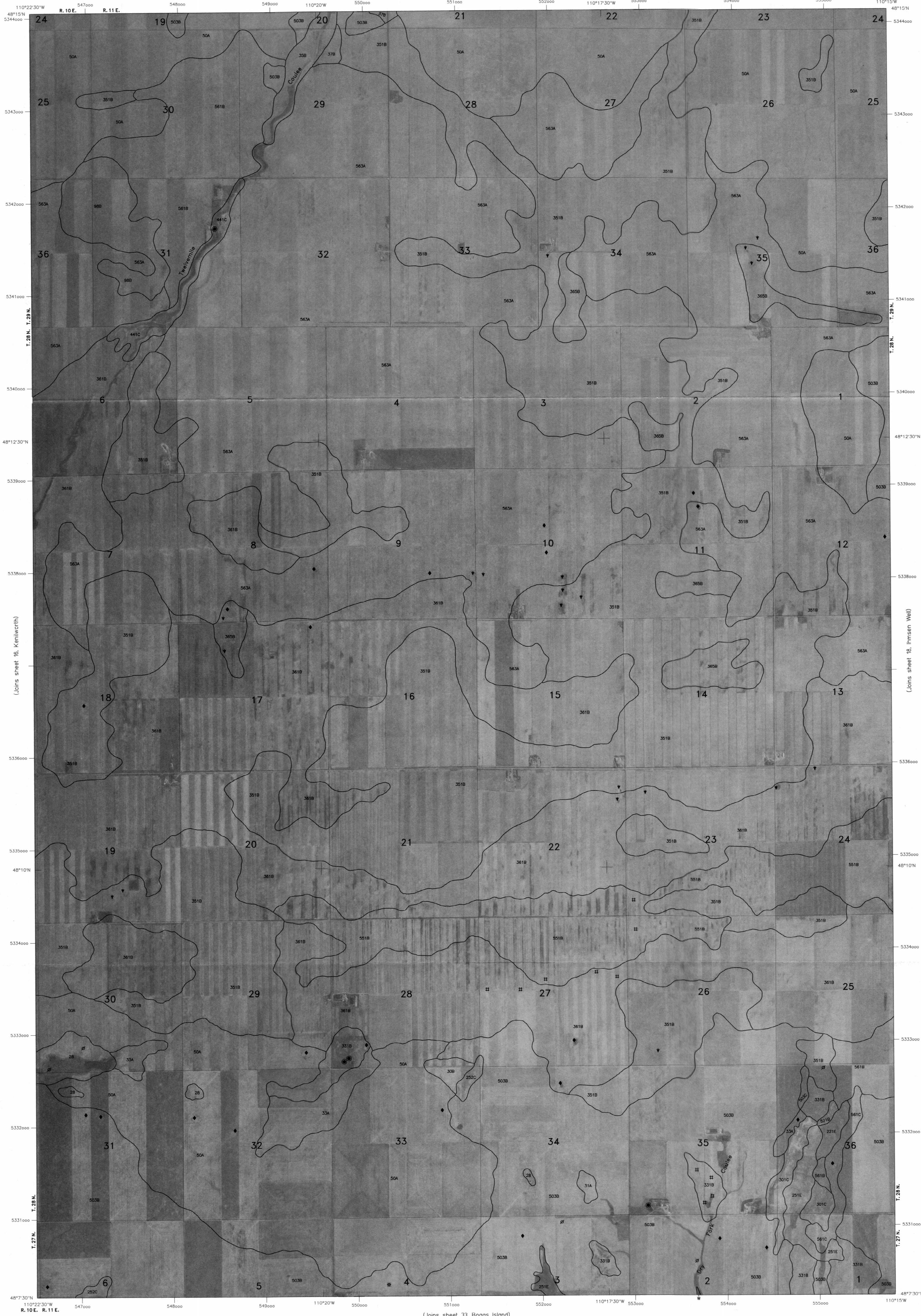
(Joins sheet 2. Fourteenmile Coulee SW)



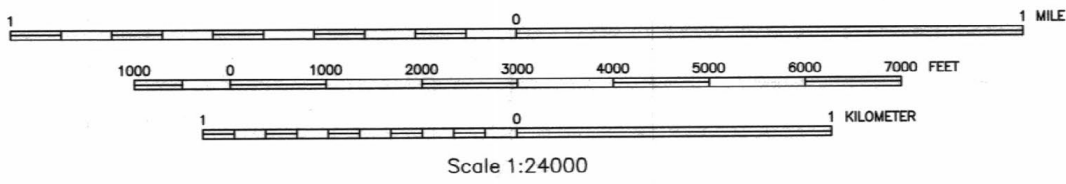
Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 16 OF 106
CHOUTEAU COUNTY AREA, MONTANA
KENILWORTH QUADRANGLE

(Joins sheet 3, Fourteenmile Coulee SE)



(Joins sheet 33, Boggs Island)



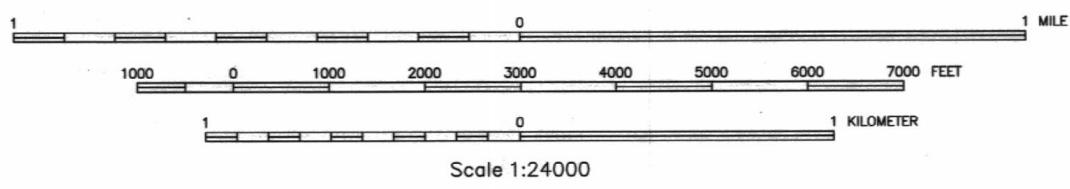
This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

(Joins sheet 4, Lonesome Lake)



(Joins sheet 34, Verona)



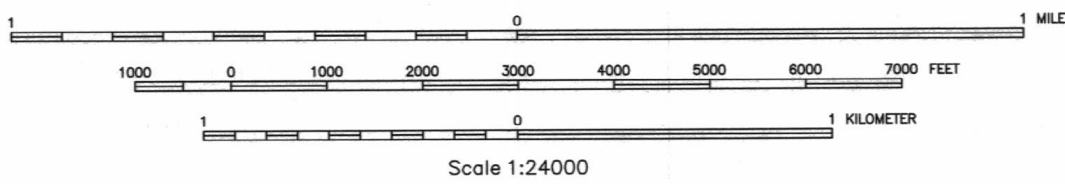
This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

(Joins sheet 5, Box Elder)



(Joins sheet 35, Lanetree Coulee)



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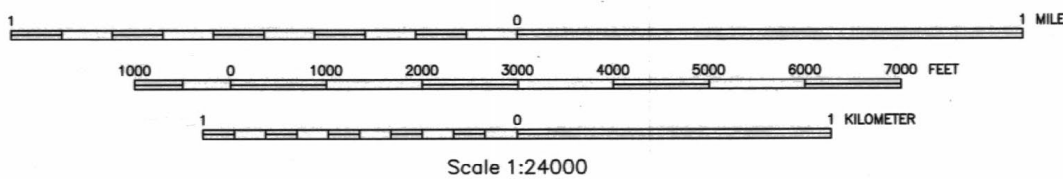
Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 19 OF 106
CHOUTEAU COUNTY AREA, MONTANA
BIG SANDY QUADRANGLE

(Joins sheet 6, Cowan Reservoir)



(Joins sheet 36, Studhorse Butte)



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Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

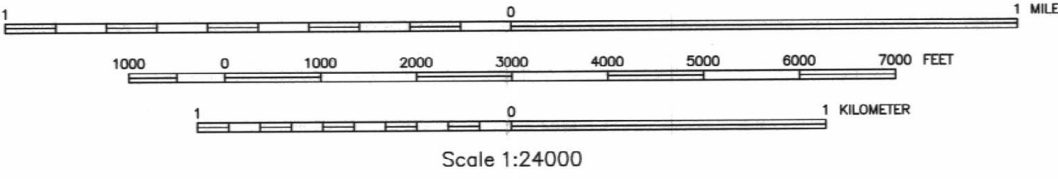
SHEET NUMBER 20 OF 106
CHOUTEAU COUNTY AREA, MONTANA
TABLE BUTTE QUADRANGLE

(Joins sheet 7, Rocky Boy)



(Joins sheet 20, Table Butte)

(Joins sheet 22, Bowers Peak)



This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

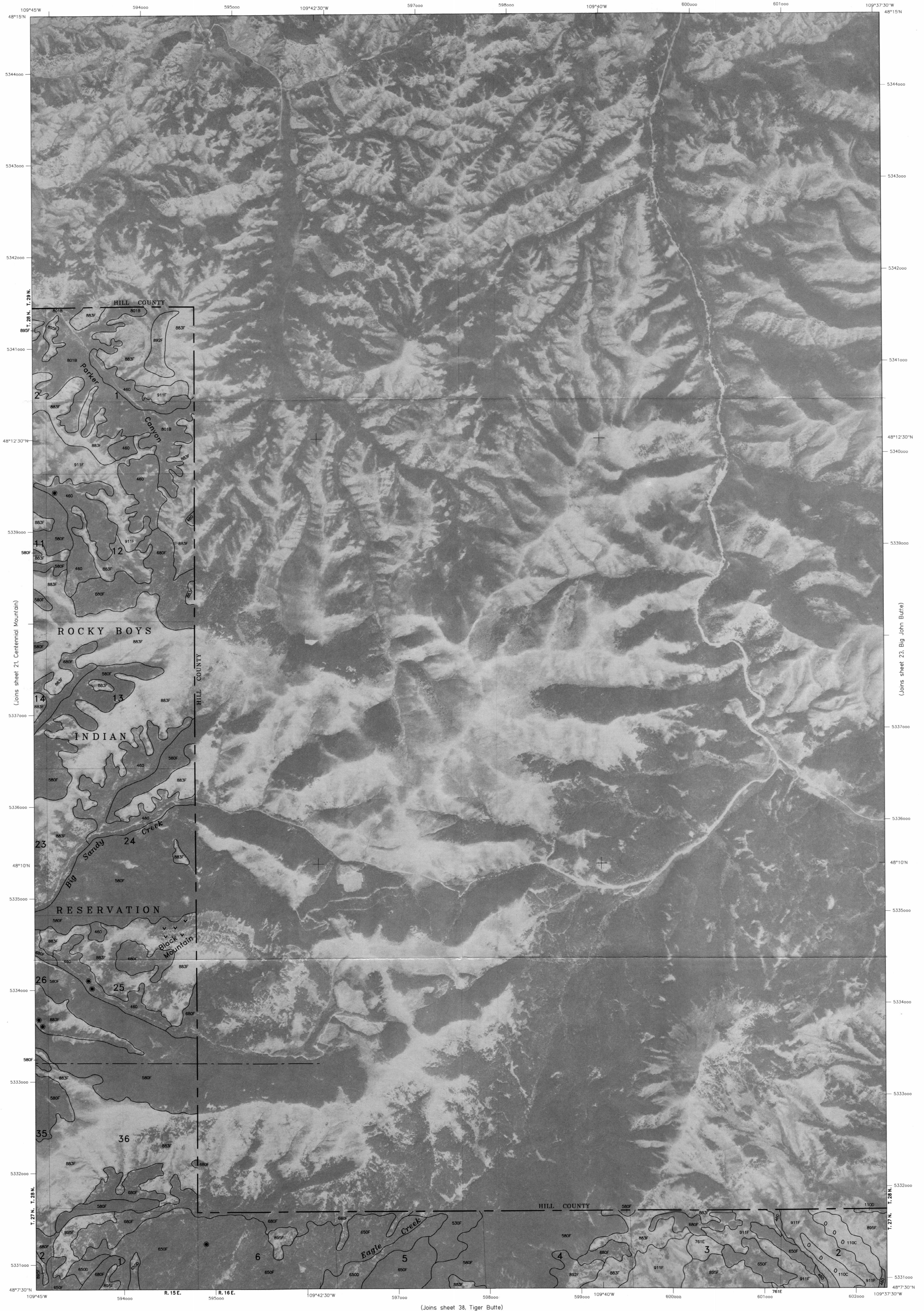
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Polyconic Projection
1927 North American Datum



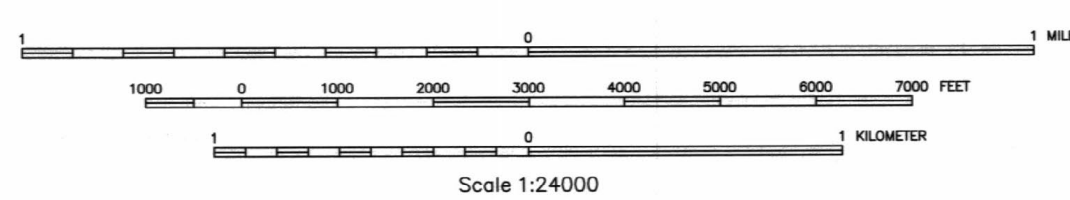
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

CHOUTEAU COUNTY AREA, MONTANA

**BOWERY PEAK QUADRANGLE
SHEET NUMBER 22
7.5 MINUTE SERIES**

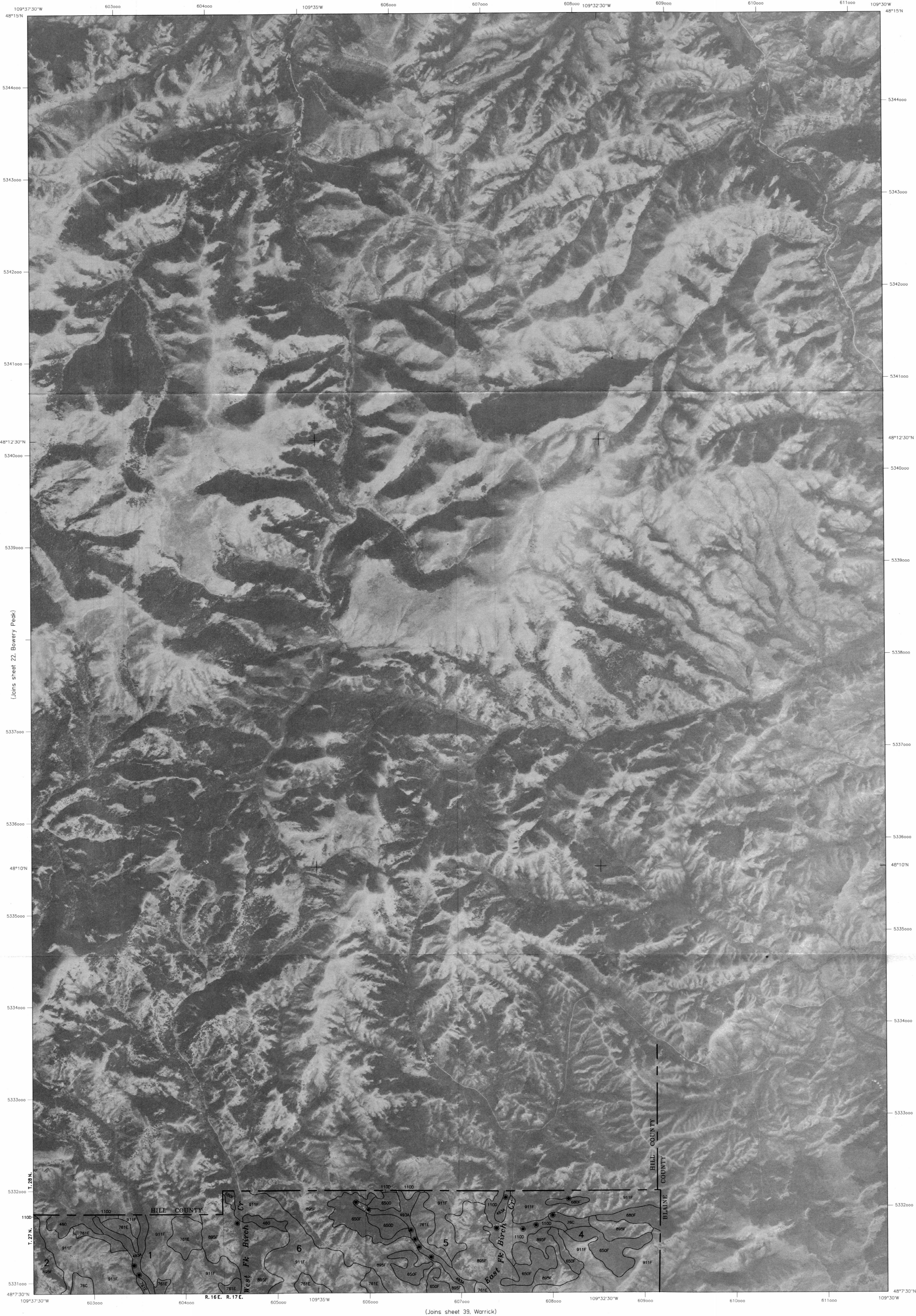


This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971–1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.



Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 22 OF 106
CHOUTEAU COUNTY AREA, MONTANA
BOWERY PEAK QUADRANGLE



This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

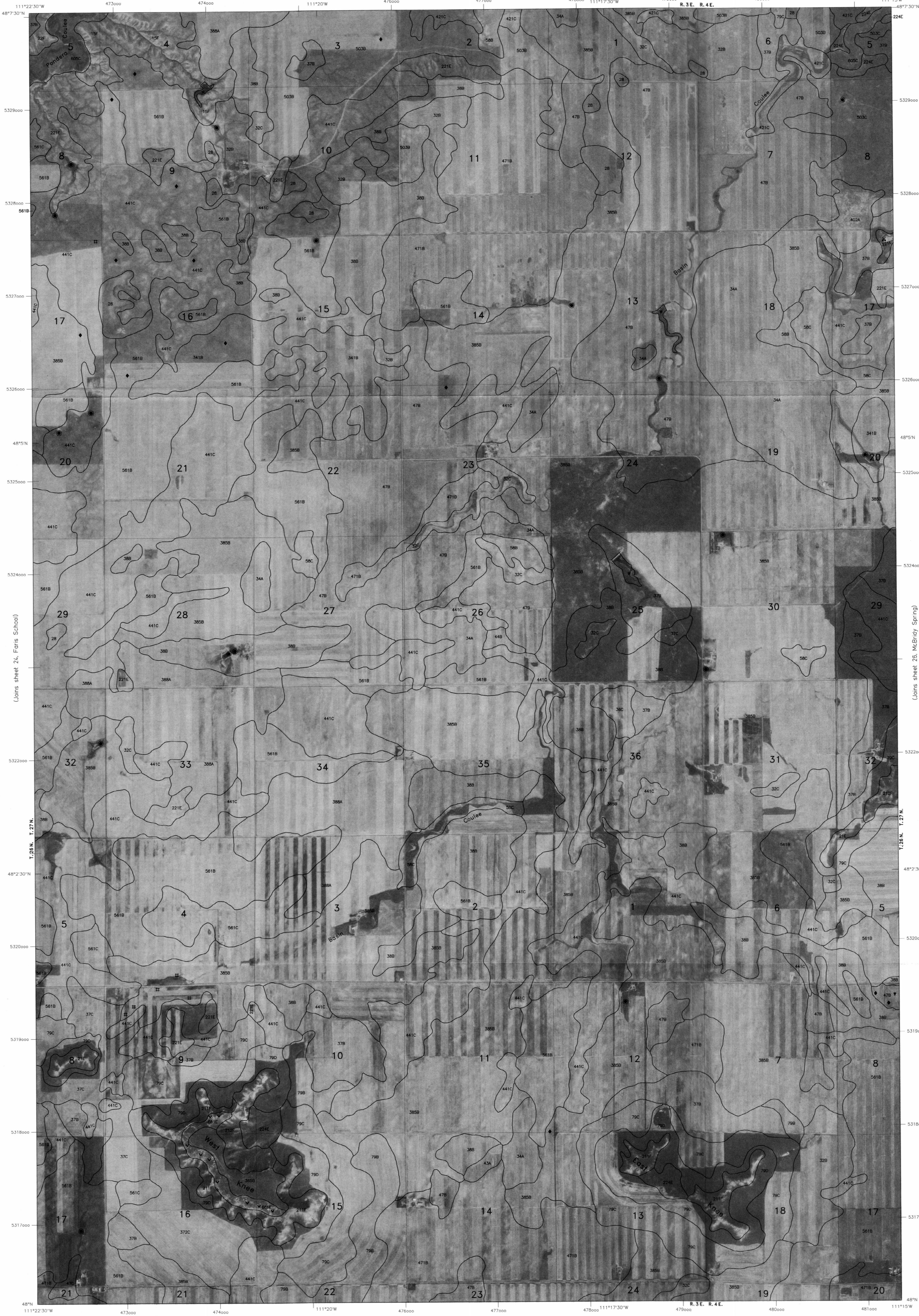
Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

CHOUTEAU COUNTY AREA, MONTANA
FARIS SCHOOL QUADRANGLE
SHEET NUMBER 24
7.5 MINUTE SERIES

This figure is a composite image showing an aerial photograph of a landscape with a topographic map overlay on the right side. The map displays contour lines, elevation points, and section numbers (e.g., 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, 32). The left side of the image is labeled with coordinates: 48°7'30"N, 111°30"W, 48°5"N, 111°27'30"W, 48°2'30"N, 111°30"W. The right side is labeled with coordinates: 48°7'30"N, 111°22'30"W, 48°5"N, 111°25"W, 48°2'30"N, 111°22'30"W. The map is divided into sections by a vertical line labeled "PONDERA COUNTY" and a horizontal line labeled "R. 2 E. R. 3 E.".

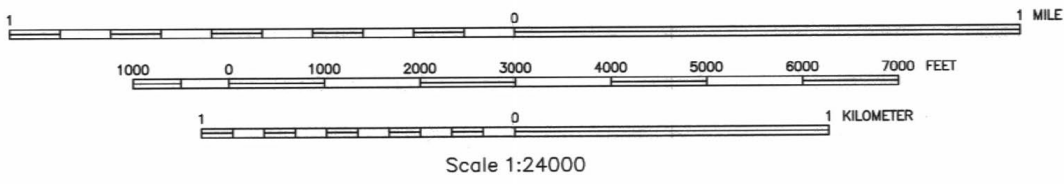
SHEET NUMBER 24 OF 106
CHOUTEAU COUNTY AREA, MONTANA
FARIS SCHOOL QUADRANGLE

(Joins sheet 9, Knees NE)



(Joins sheet 41, Shannon Bridge)

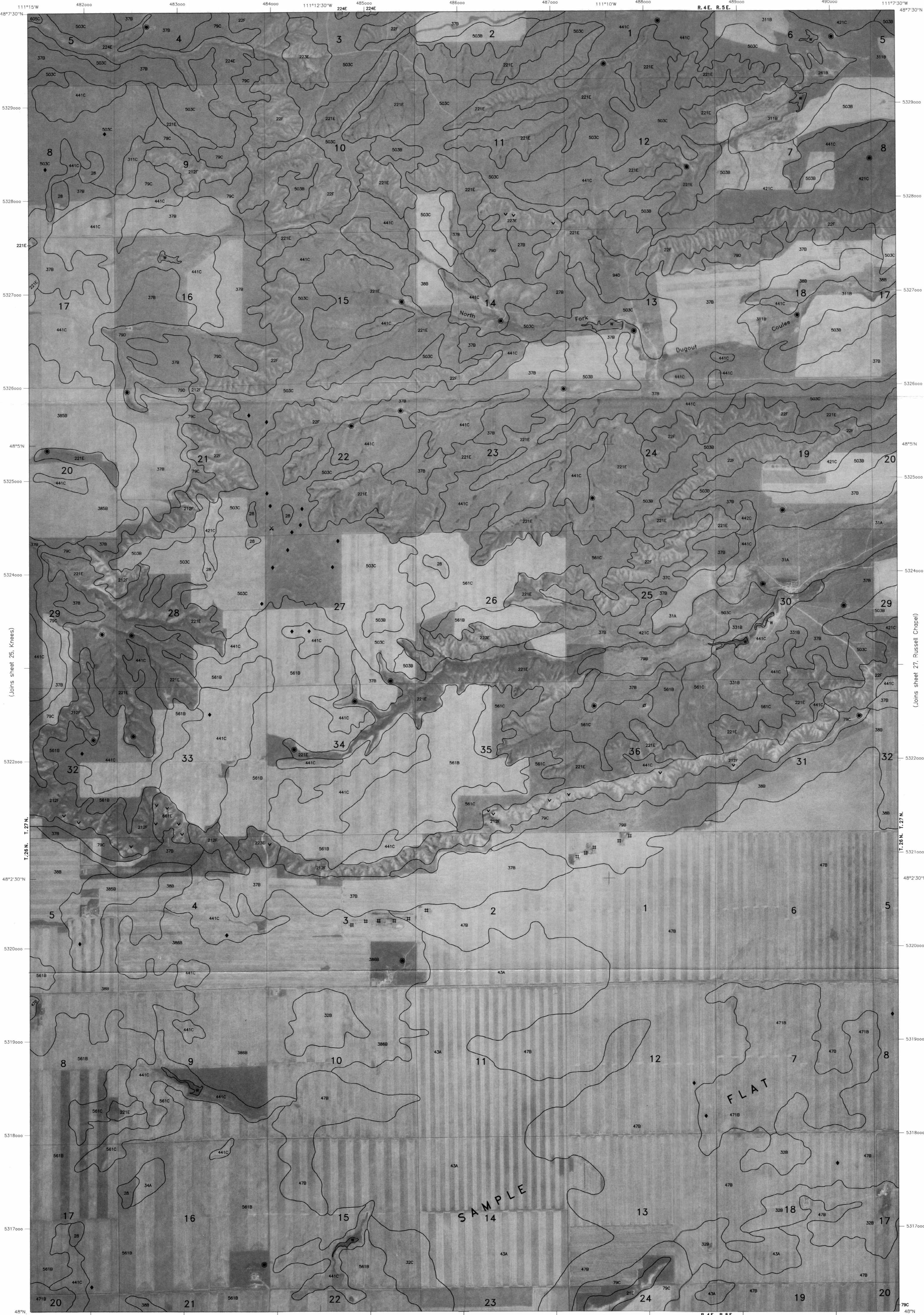
This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.



Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum



(Joins sheet 10, Carlson Coulee)



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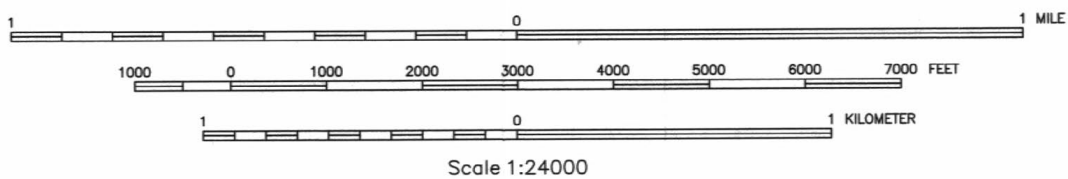
Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 26 OF 106
CHOUTEAU COUNTY AREA, MONTANA
MC BRIDY SPRING QUADRANGLE

(Joins sheet 11, Uphill Creek)



(Joins sheet 43, Dent Bridge NE)



This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

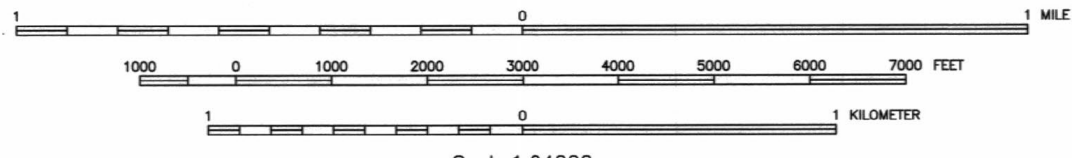
Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 27 OF 106
CHOUTEAU COUNTY AREA, MONTANA
RUSSELL CHAPEL QUADRANGLE

(Joins sheet 12, Goose Bill Butte NW)



(Joins sheet 44, Apple School)



This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum



(Joins sheet 13, Penzer School)

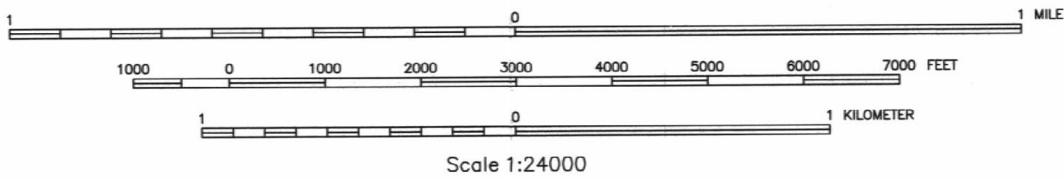


(Joins sheet 28, Dorner School)

(Joins sheet 30, Day School SW)

(Joins sheet 45, Carter NE)

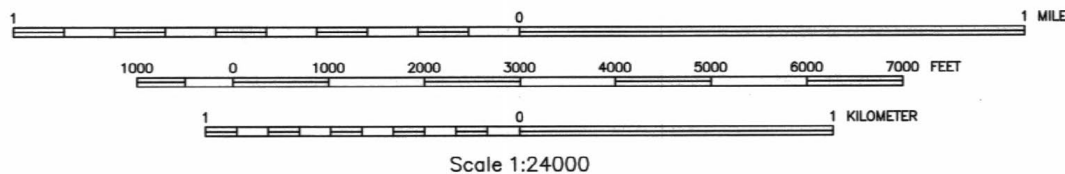
This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.



Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 29 OF 106
CHOUTEAU COUNTY AREA, MONTANA
GOOSE BILL BUTTE QUADRANGLE

(Joins sheet 14, Dutch Henry Coulee)



Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

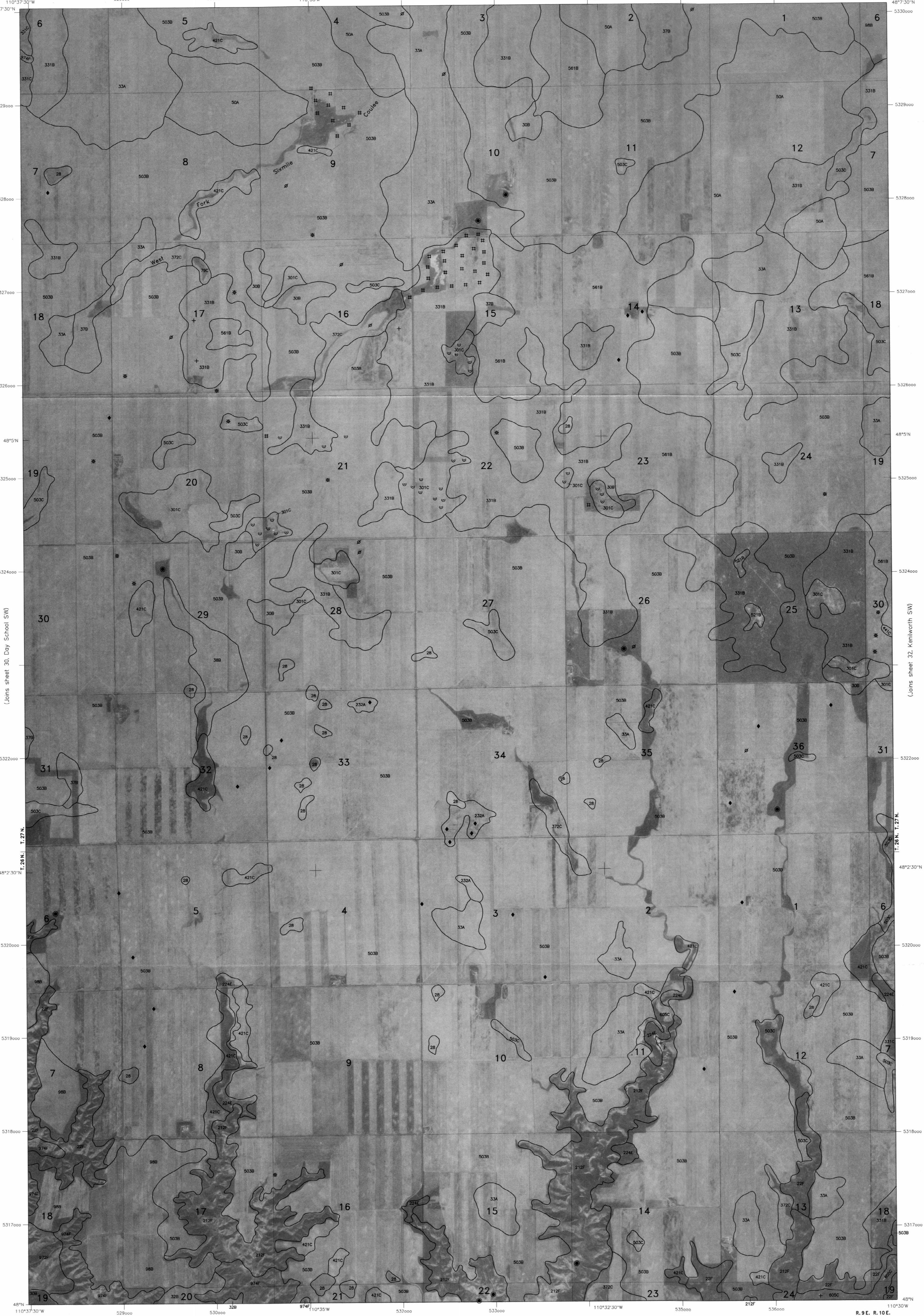


SHEET NUMBER 30 OF 106
CHOUTEAU COUNTY AREA, MONTANA
DAY SCHOOL SW QUADRANGLE

This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

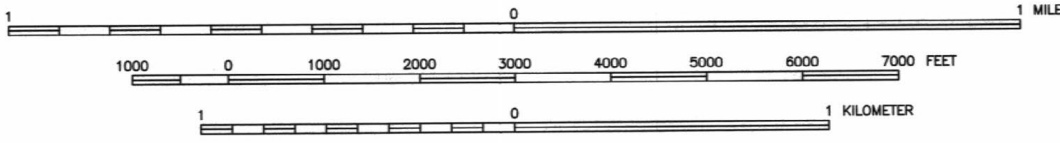
(Joins sheet 15, Discovery Butte)

R. 9 E. R. 10 E.



(Joins sheet 47, Loma West)

R. 9 E. R. 10 E.

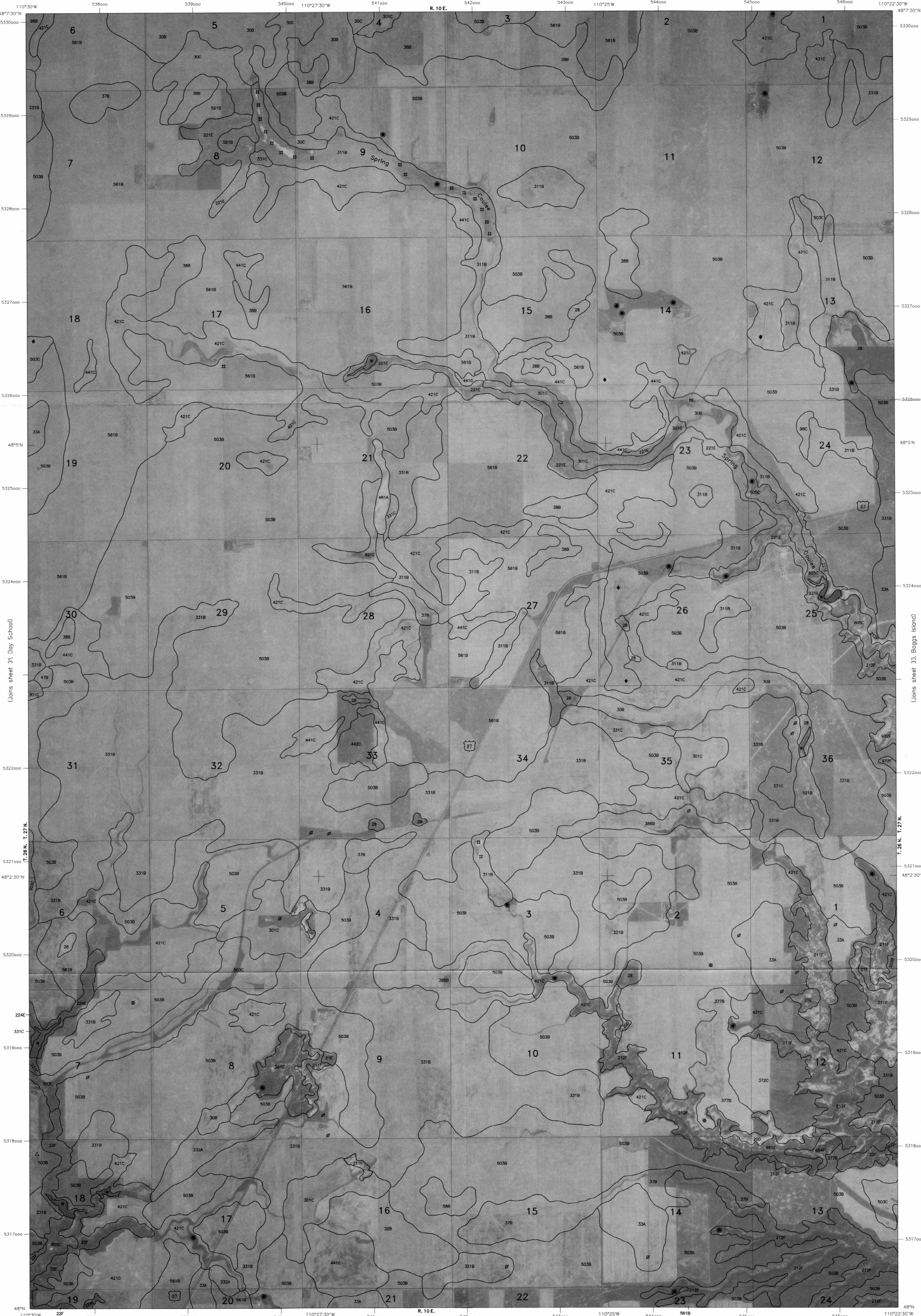


This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

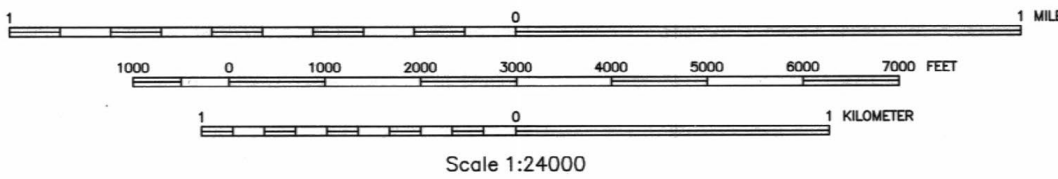
SHEET NUMBER 31 OF 106
CHOUTEAU COUNTY AREA, MONTANA
DAY SCHOOL QUADRANGLE

(Joins sheet 16, Kenilworth)



(Joins sheet 48, Loma East)

This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.



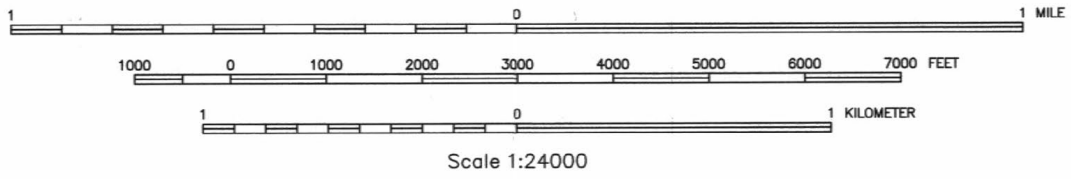
Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum



SHEET NUMBER 32 OF 106
CHOUTEAU COUNTY, MONTANA
KENILWORTH SW QUADRANGLE



This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.



Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum





This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

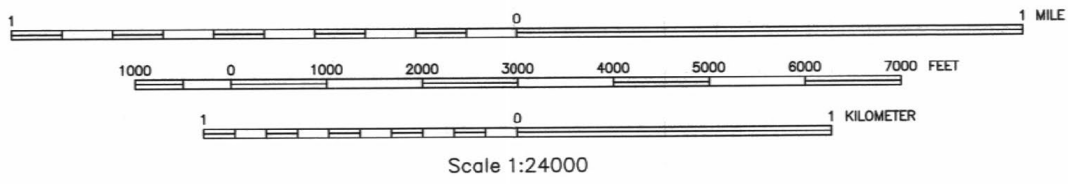
Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 34 OF 106
CHOUTEAU COUNTY AREA, MONTANA
VERONA QUADRANGLE

(Joins sheet 19, Big Sandy)



(Joins sheet 51, Pilot Rock)



This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

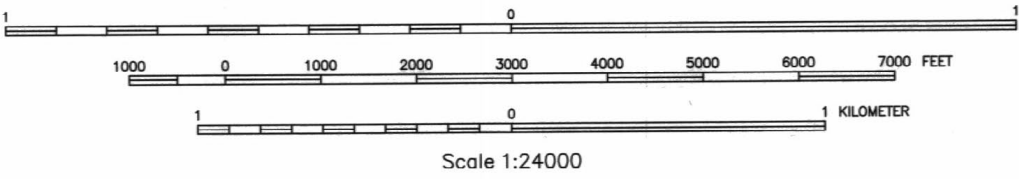
Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 35 OF 106
CHOUTEAU COUNTY AREA, MONTANA
LONETREE COULEE QUADRANGLE

(Joins sheet 20, Table Butte)



This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

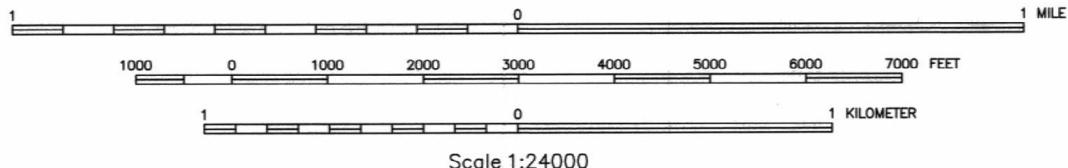


Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 36 OF 106
CHOUTEAU COUNTY AREA, MONTANA
STUDHORSE BUTTE QUADRANGLE



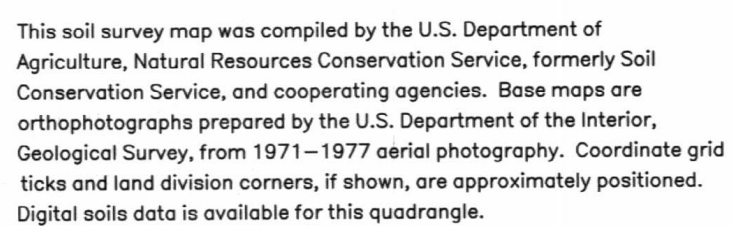
This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.



Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum



CHOUTEAU COUNTY AREA, MONTANA
TIGER BUTTE QUADRANGLE
SHEET NUMBER 38
7.5 MINUTE SERIES



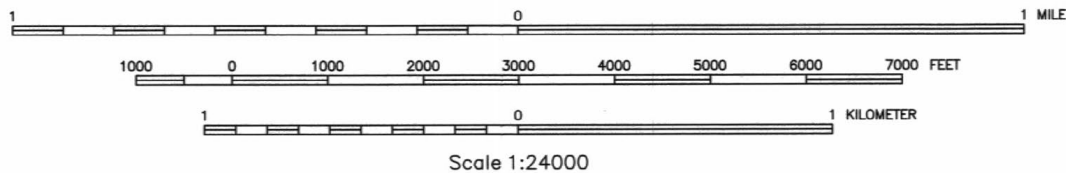
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Polyconic Projection
1927 North American Datum

SHEET NUMBER 38 OF 106
CHOUTEAU COUNTY AREA, MONTANA
TIGER BUTTE QUADRANGLE

(Joins sheet 23, Big John Butte)



(Joins sheet 55, Eskay NE)

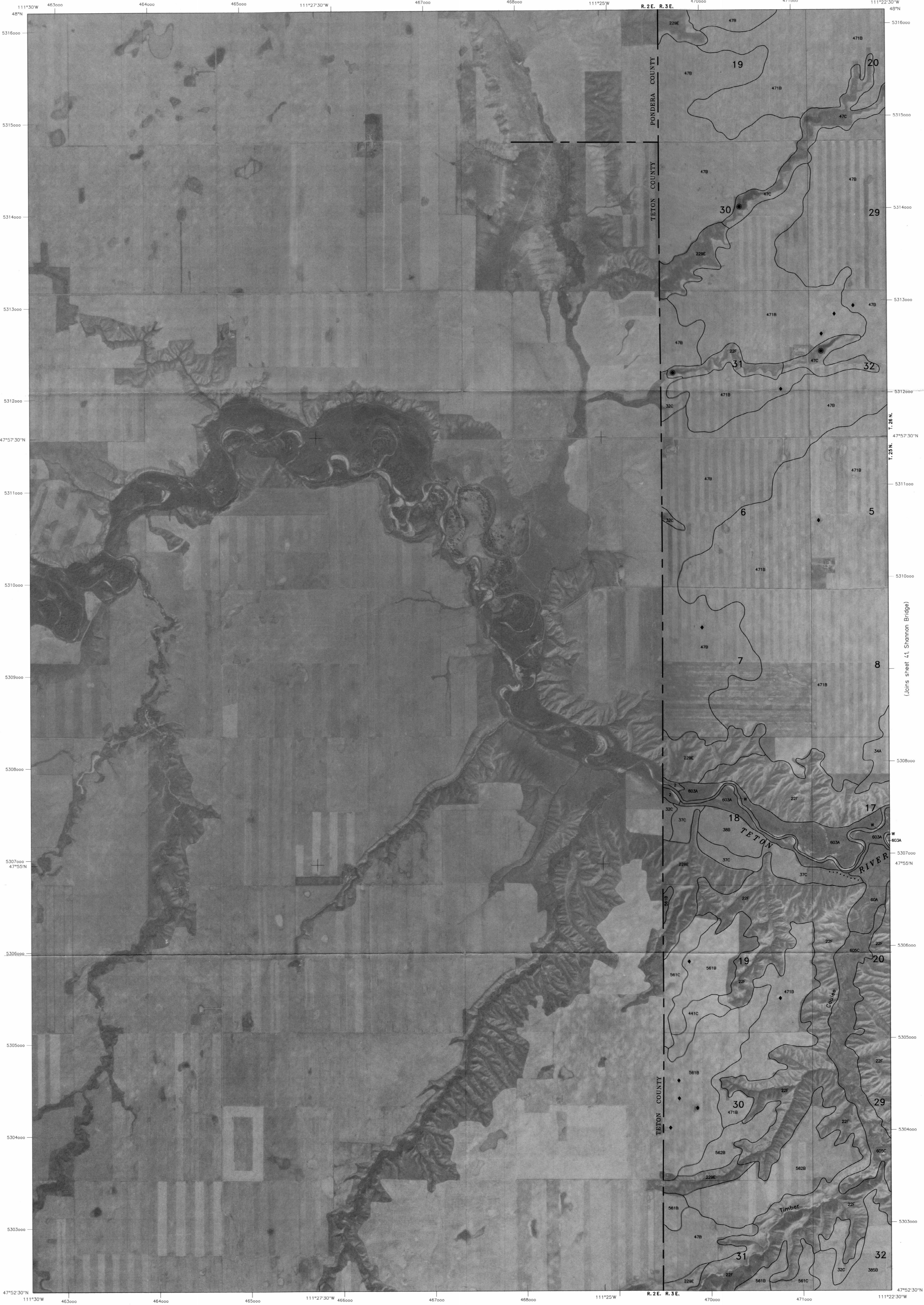


This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum



(Joins sheet 24, Faris School)



(Joins sheet 56, Timber Coulee South)

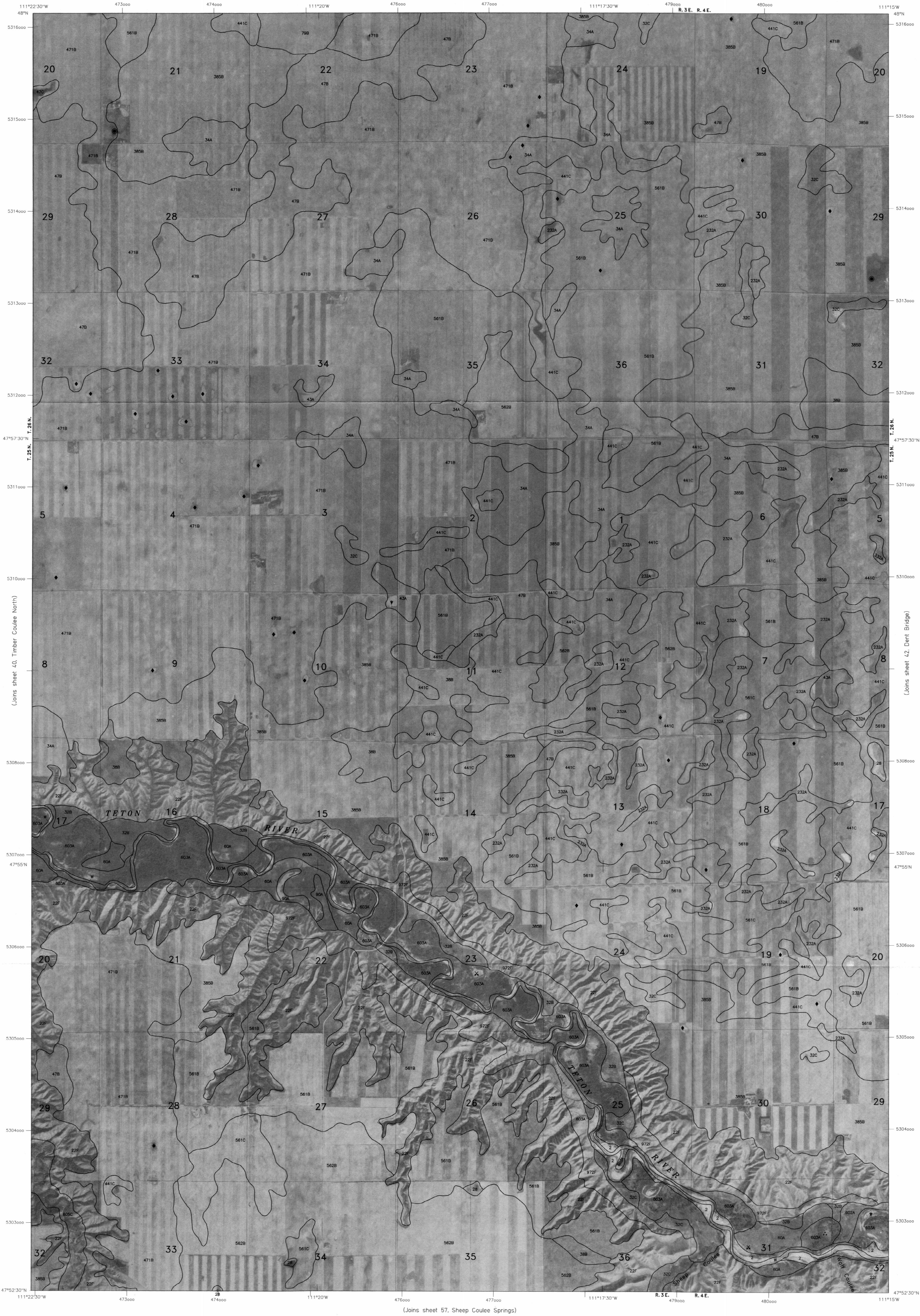
(Joins sheet 41, Shannon Bridge)

This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

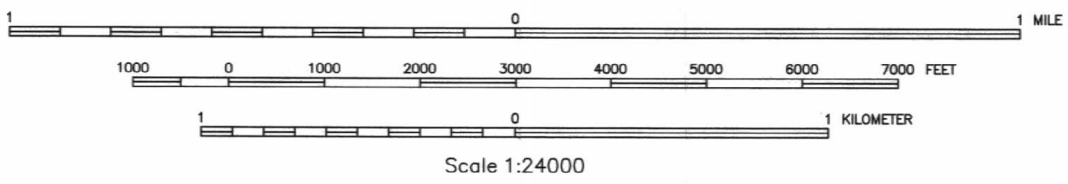
Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 40 OF 106
CHOUTEAU COUNTY AREA, MONTANA
TIMBER COULEE NORTH QUADRANGLE

(Joins sheet 25, Knees)



(Joins sheet 57, Sheep Coulee Springs)



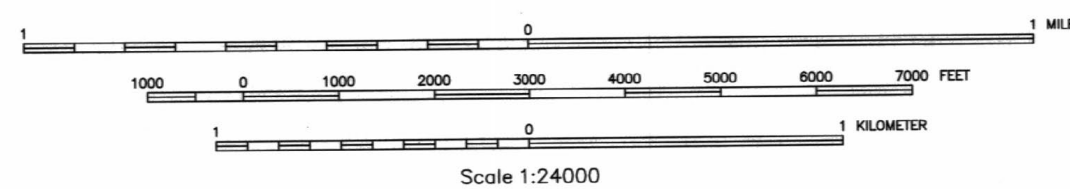
This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum



SHEET NUMBER 41 OF 106
CHOUTEAU COUNTY AREA, MONTANA
SHANNON BRIDGE QUADRANGLE

R. 4 E. R. 5 E.



Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

(Joins sheet 27, Russell Chapel)



(Joins sheet 59, Antelope Lake)

This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

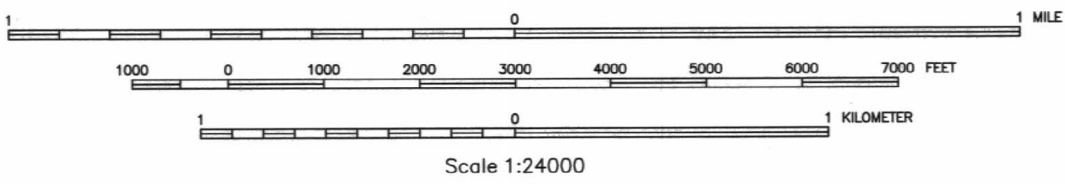
Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 43 OF 106
CHOUTEAU COUNTY AREA, MONTANA
DENT BRIDGE NE QUADRANGLE

(Joins sheet 28, Dorner School)



(Joins sheet 60, Carter)

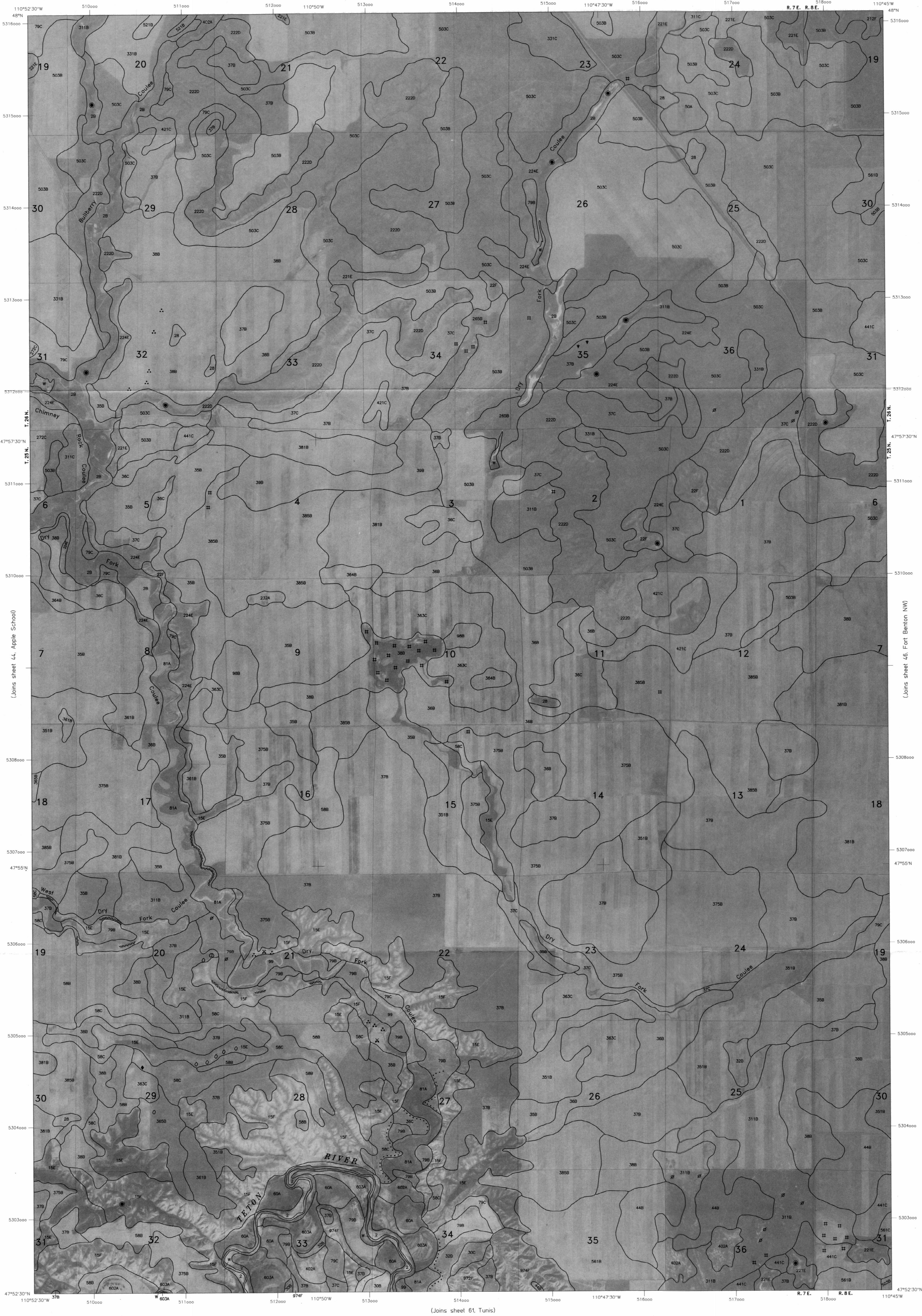


Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum



This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

(Joins sheet 29, Goose Bill Butte)

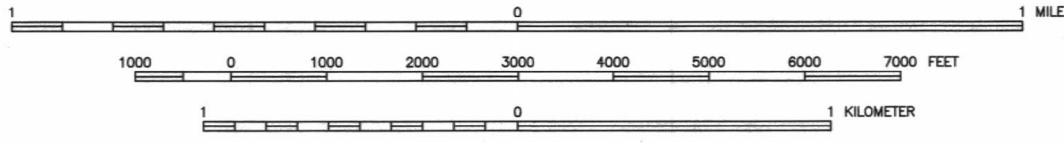


This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum



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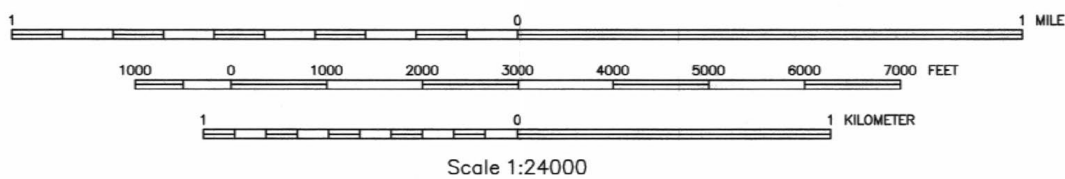


Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

(Joins sheet 31, Day School)



(Joins sheet 63, O'Hanlon Coulee)



This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 47 OF 106
CHOUTEAU COUNTY AREA, MONTANA
LOMA WEST QUADRANGLE

CHOUTEAU COUNTY AREA, MONTANA
LOMA EAST QUADRANGLE
SHEET NUMBER 48
7.5 MINUTE SERIES

This is a detailed topographic map of a region in Montana, centered on the confluence of the Missouri River and the Marias River. The map features a grid with coordinates ranging from 110°30'W to 110°22'30'W and 47°52'30'N to 48°N. The Missouri River flows from the upper right towards the lower left, where it meets the Marias River. The Marias River flows from the lower left towards the upper right. The map shows numerous contour lines indicating elevation, with labels such as 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1300, 1400, 1500, 1600, 1700, 1800, 1900, 2000, 2100, 2200, 2300, 2400, 2500, 2600, 2700, 2800, 2900, 3000, 3100, 3200, 3300, 3400, 3500, 3600, 3700, 3800, 3900, 4000, 4100, 4200, 4300, 4400, 4500, 4600, 4700, 4800, 4900, 5000, 5100, 5200, 5300, 5400, 5500, 5600, 5700, 5800, 5900, 6000, 6100, 6200, 6300, 6400, 6500, 6600, 6700, 6800, 6900, 7000, 7100, 7200, 7300, 7400, 7500, 7600, 7700, 7800, 7900, 8000, 8100, 8200, 8300, 8400, 8500, 8600, 8700, 8800, 8900, 9000, 9100, 9200, 9300, 9400, 9500, 9600, 9700, 9800, 9900, 10000, 10100, 10200, 10300, 10400, 10500, 10600, 10700, 10800, 10900, 11000, 11100, 11200, 11300, 11400, 11500, 11600, 11700, 11800, 11900, 12000, 12100, 12200, 12300, 12400, 12500, 12600, 12700, 12800, 12900, 13000, 13100, 13200, 13300, 13400, 13500, 13600, 13700, 13800, 13900, 14000, 14100, 14200, 14300, 14400, 14500, 14600, 14700, 14800, 14900, 15000, 15100, 15200, 15300, 15400, 15500, 15600, 15700, 15800, 15900, 16000, 16100, 16200, 16300, 16400, 16500, 16600, 16700, 16800, 16900, 17000, 17100, 17200, 17300, 17400, 17500, 17600, 17700, 17800, 17900, 18000, 18100, 18200, 18300, 18400, 18500, 18600, 18700, 18800, 18900, 19000, 19100, 19200, 19300, 19400, 19500, 19600, 19700, 19800, 19900, 20000, 20100, 20200, 20300, 20400, 20500, 20600, 20700, 20800, 20900, 21000, 21100, 21200, 21300, 21400, 21500, 21600, 21700, 21800, 21900, 22000, 22100, 22200, 22300, 22400, 22500, 22600, 22700, 22800, 22900, 23000, 23100, 23200, 23300, 23400, 23500, 23600, 23700, 23800, 23900, 24000, 24100, 24200, 24300, 24400, 24500, 24600, 24700, 24800, 24900, 25000, 25100, 25200, 25300, 25400, 25500, 25600, 25700, 25800, 25900, 26000, 26100, 26200, 26300, 26400, 26500, 26600, 26700, 26800, 26900, 27000, 27100, 27200, 27300, 27400, 27500, 27600, 27700, 27800, 27900, 28000, 28100, 28200, 28300, 28400, 28500, 28600, 28700, 28800, 28900, 29000, 29100, 29200, 29300, 29400, 29500, 29600, 29700, 29800, 29900, 30000, 30100, 30200, 30300, 30400, 30500, 30600, 30700, 30800, 30900, 31000, 31100, 31200, 31300, 31400, 31500, 31600, 31700, 31800, 31900, 32000, 32100, 32200, 32300, 32400, 32500, 32600, 32700, 32800, 32900, 33000, 33100, 33200, 33300, 33400, 33500, 33600, 33700, 33800, 33900, 34000, 34100, 34200, 34300, 34400, 34500, 34600, 34700, 34800, 34900, 35000, 35100, 35200, 35300, 35400, 35500, 35600, 35700, 35800, 35900, 36000, 36100, 36200, 36300, 36400, 36500, 36600, 36700, 36800, 36900, 37000, 37100, 37200, 37300, 37400, 37500, 37600, 37700, 37800, 37900, 38000, 38100, 38200, 38300, 38400, 38500, 38600, 38700, 38800, 38900, 39000, 39100, 39200, 39300, 39400, 39500, 39600, 39700, 39800, 39900, 40000, 40100, 40200, 40300, 40400, 40500, 40600, 40700, 40800, 40900, 41000, 41100, 41200, 41300, 41400, 41500, 41600, 41700, 41800, 41900, 42000, 42100, 42200, 42300, 42400, 42500, 42600, 42700, 42800, 42900, 43000, 43100, 43200, 43300, 43400, 43500, 43600, 43700, 43800, 43900, 44000, 44100, 44200, 44300, 44400, 44500, 44600, 44700, 44800, 44900, 45000, 45100, 45200, 45300, 45400, 45500, 45600, 45700, 45800, 45900, 46000, 46100, 46200, 46300, 46400, 46500, 46600, 46700, 46800, 46900, 47000, 47100, 47200, 47300, 47400, 47500, 47600, 47700, 47800, 47900, 48000, 48100, 48200, 48300, 48400, 48500, 48600, 48700, 48800, 48900, 49000, 49100, 49200, 49300, 49400, 49500, 49600, 49700, 49800, 49900, 50000, 50100, 50200, 50300, 50400, 50500, 50600, 50700, 50800, 50900, 51000, 51100, 51200, 51300, 51400, 51500, 51600, 51700, 51800, 51900, 52000, 52100, 52200, 52300, 52400, 52500, 52600, 52700, 52800, 52900, 53000, 53100, 53200, 53300, 53400, 53500, 53600, 53700, 53800, 53900, 54000, 54100, 54200, 54300, 54400, 54500, 54600, 54700, 54800, 54900, 55000, 55100, 55200, 55300, 55400, 55500, 55600, 55700, 55800, 55900, 56000, 56100, 56200, 56300, 56400, 56500, 56600, 56700, 56800, 56900, 57000, 57100, 57200, 57300, 57400, 57500, 5760

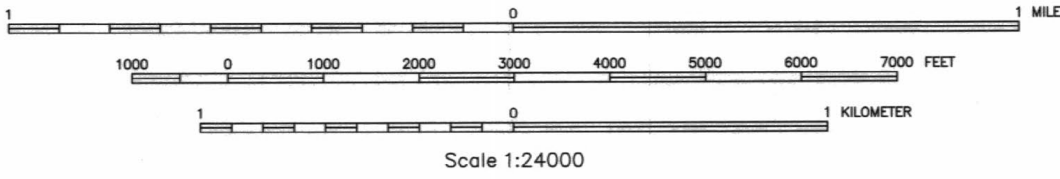
Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 48 OF 106
CHOUTEAU COUNTY AREA, MONTANA
LOMA EAST QUADRANGLE

(Joins sheet 33, Boggs Island)



(Joins sheet 65, Stranahan SE)



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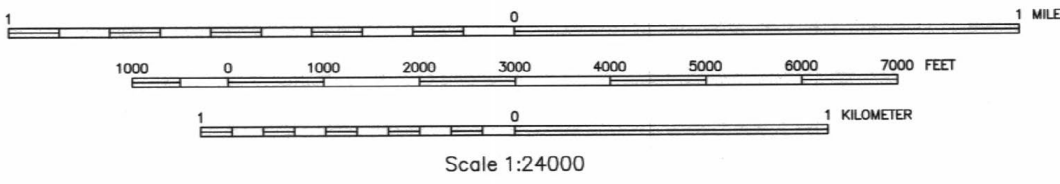
Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum



(Joins sheet 34, Verona)



(Joins sheet 66, Eagle Buttes SW)

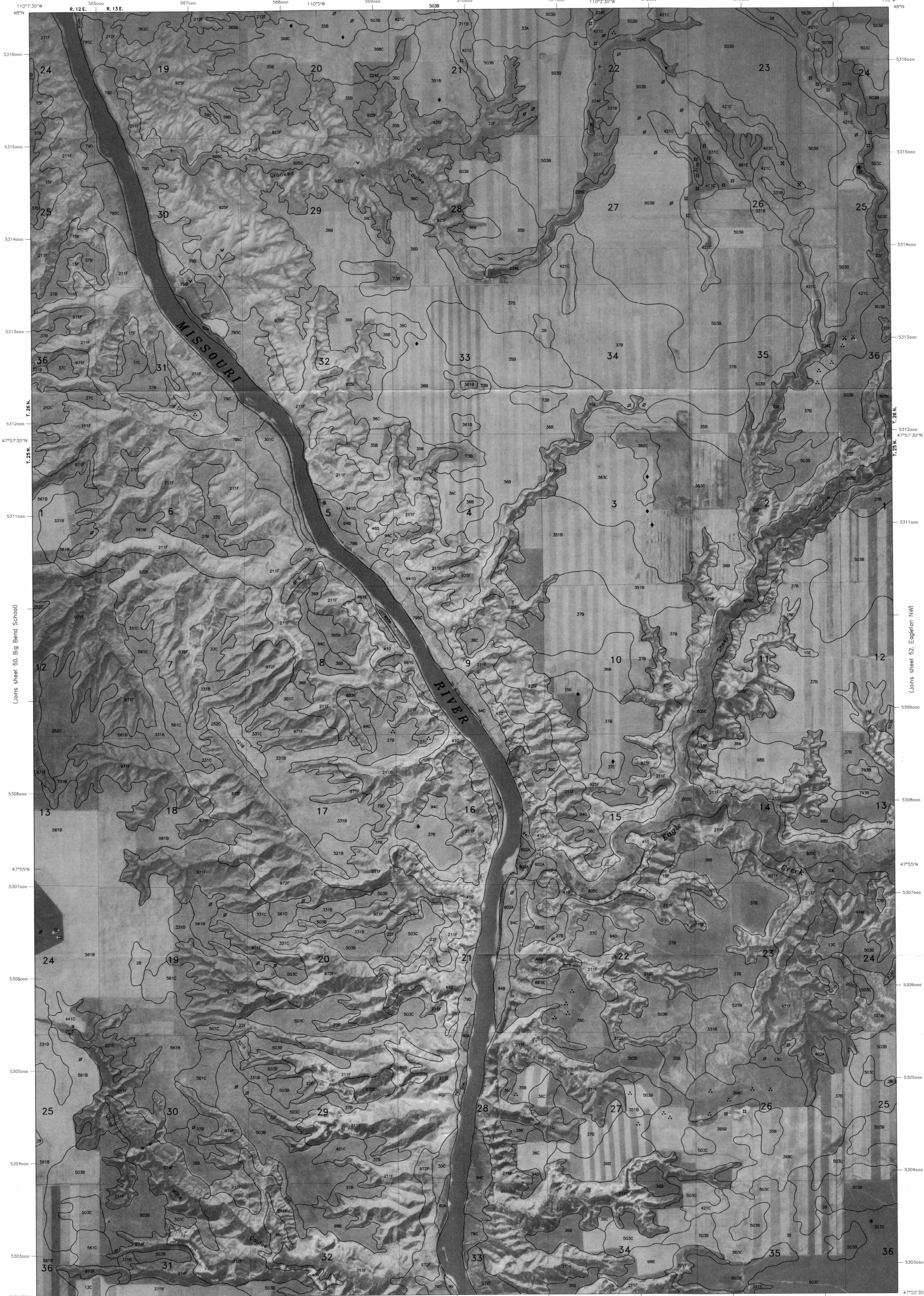


This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

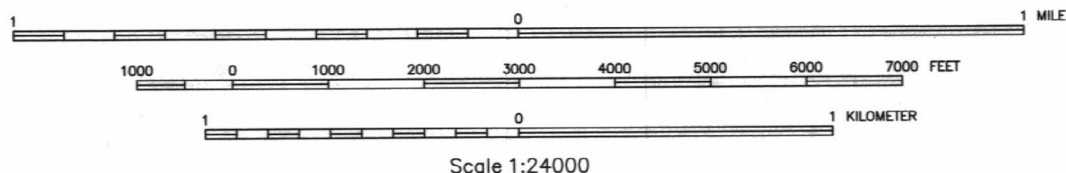
Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 50 OF 106
CHOUTEAU COUNTY AREA, MONTANA
BIG BEND SCHOOL QUADRANGLE

(Joins sheet 35, Lonetree Coulee)



(Joins sheet 67, Eagle Buttes)

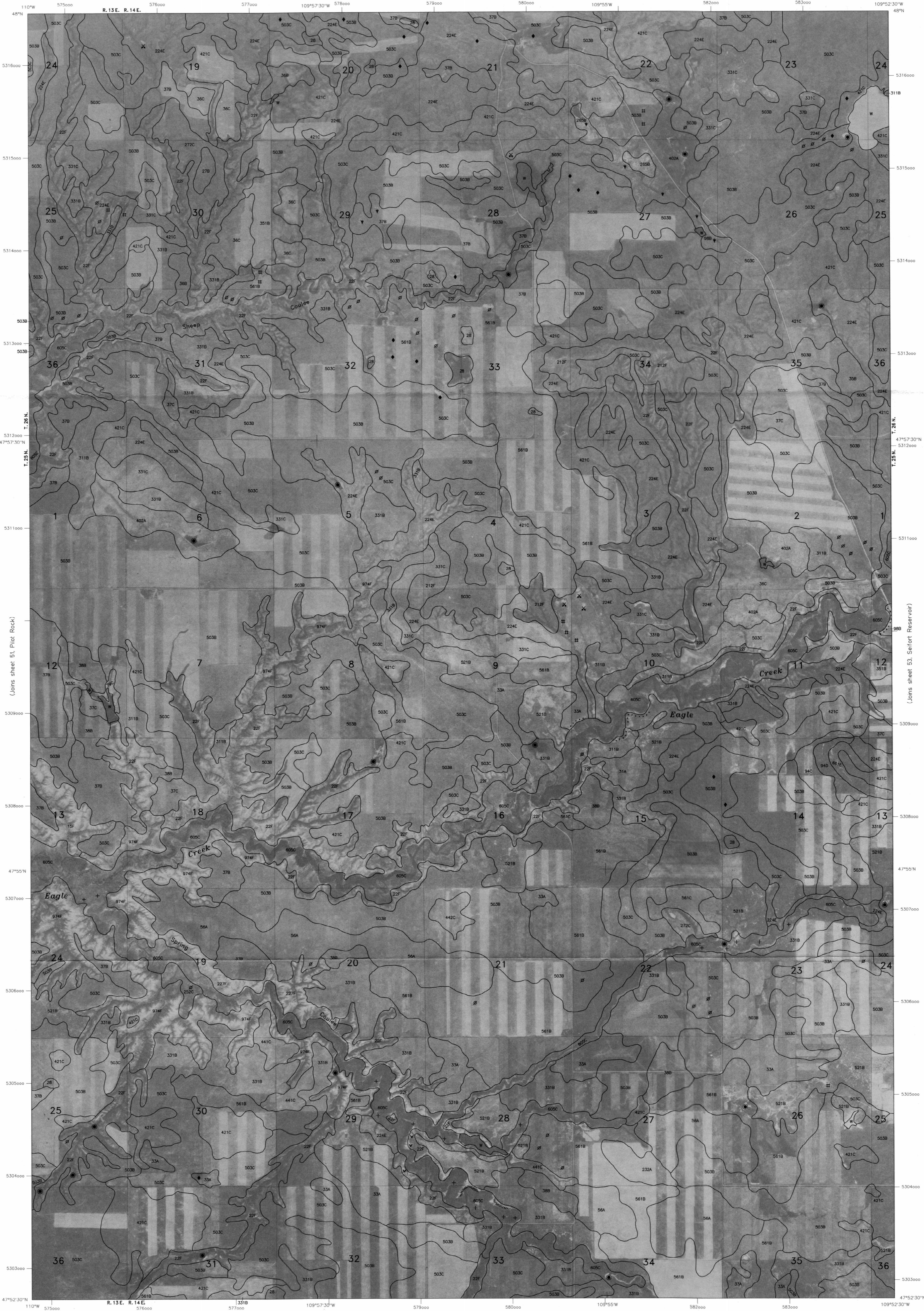


This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

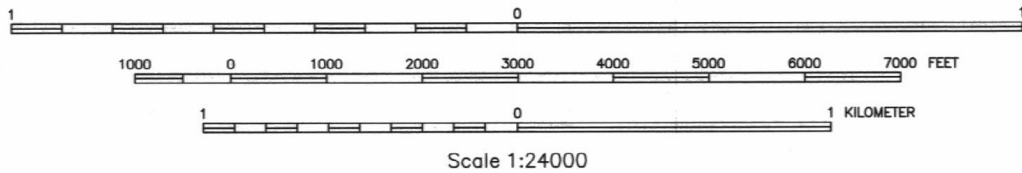
Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum



(Joins sheet 36, Studhorse Butte)



(Joins sheet 68, Dark Butte)



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Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum



(Joins sheet 37, Ryan Butte)



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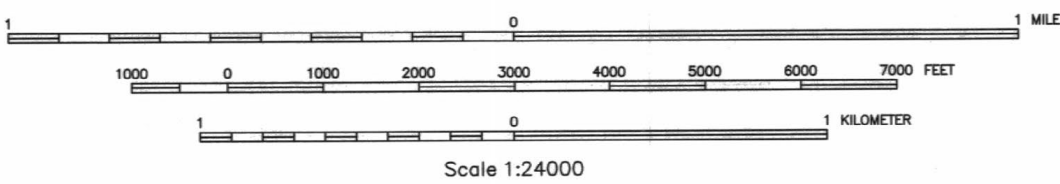
Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 53 OF 106
CHOUTEAU COUNTY AREA, MONTANA
SEIFORT RESERVOIR QUADRANGLE

(Joins sheet 38, Tiger Butte)



(Joins sheet 70, Pigtail Coulee)



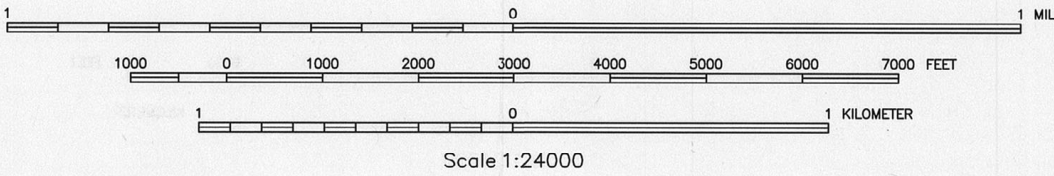
This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

(Joins sheet 39, Warrick)



(Joins sheet 71 Chase Hill)



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Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 55 OF 106
CHOUTEAU COUNTY AREA, MONTANA
ESKAY NE QUADRANGLE

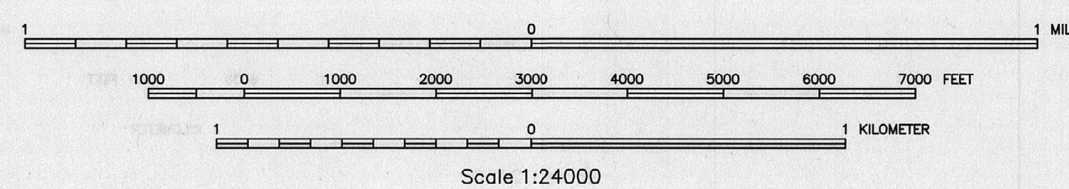
UNITED STATES
DEPARTMENT OF AGRICULTURE

CHOUTEAU COUNTY AREA, MONTANA
TIMBER COULEE SOUTH QUADRANGLE
SHEET NUMBER 58

(Joins sheet 40, Timber Coulee North)



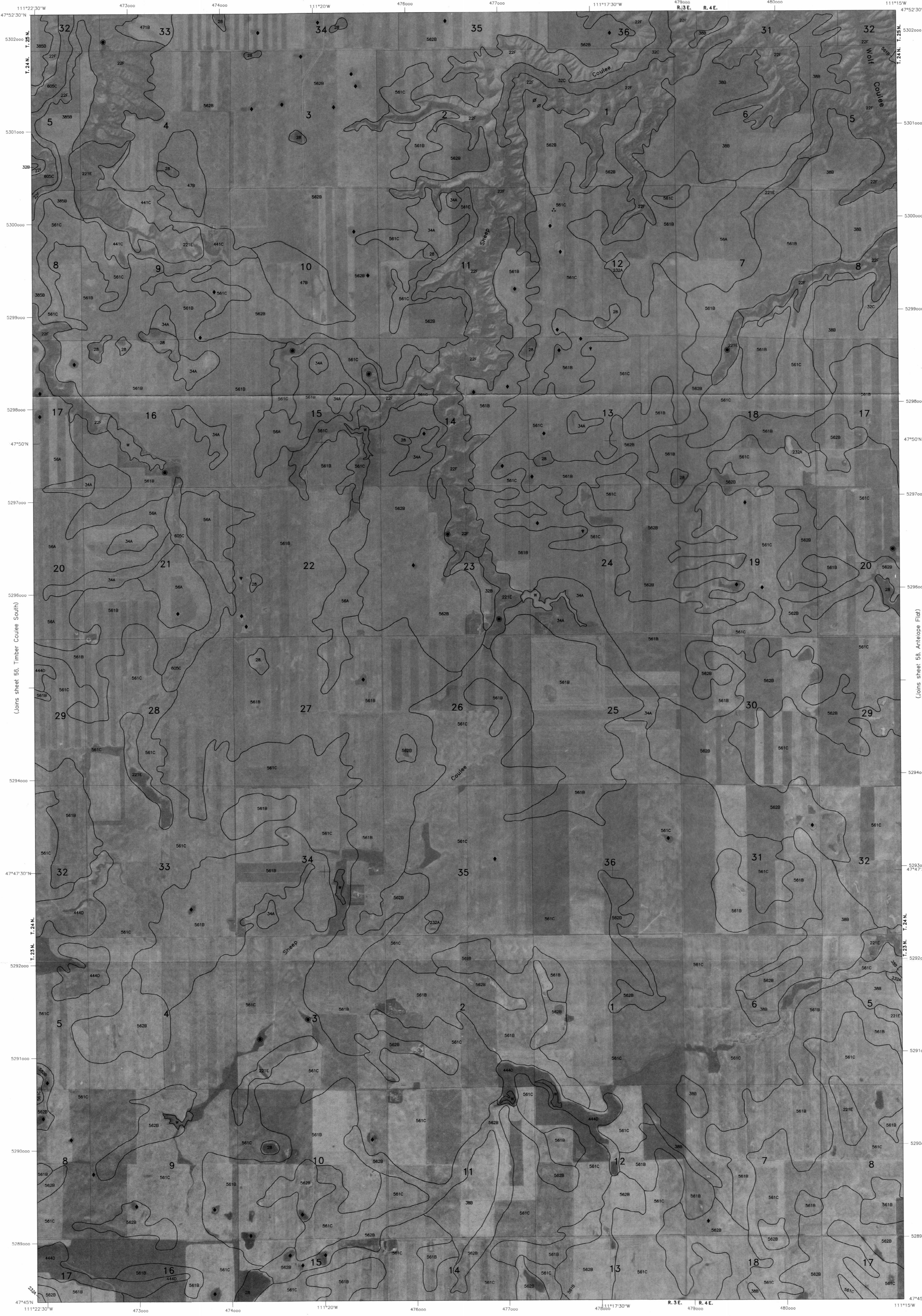
This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.



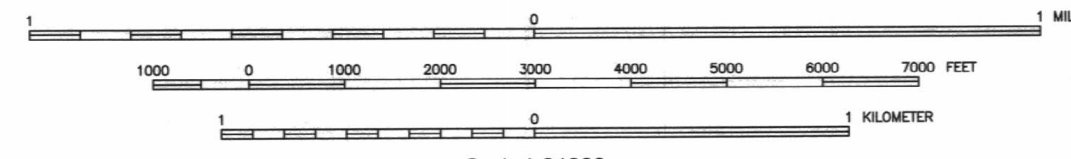
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Polyconic Projection
1927 North American Datum

SHEET NUMBER 56 OF 106
CHOUTEAU COUNTY AREA, MONTANA
TIMBER COULEE SOUTH QUADRANGLE

(Joins sheet 41, Shannon Bridge)



(Joins sheet 73, Benton Lake East)



This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 57 OF 106
CHOUTEAU COUNTY AREA, MONTANA
SHEEP COULEE SPRING QUADRANGLE

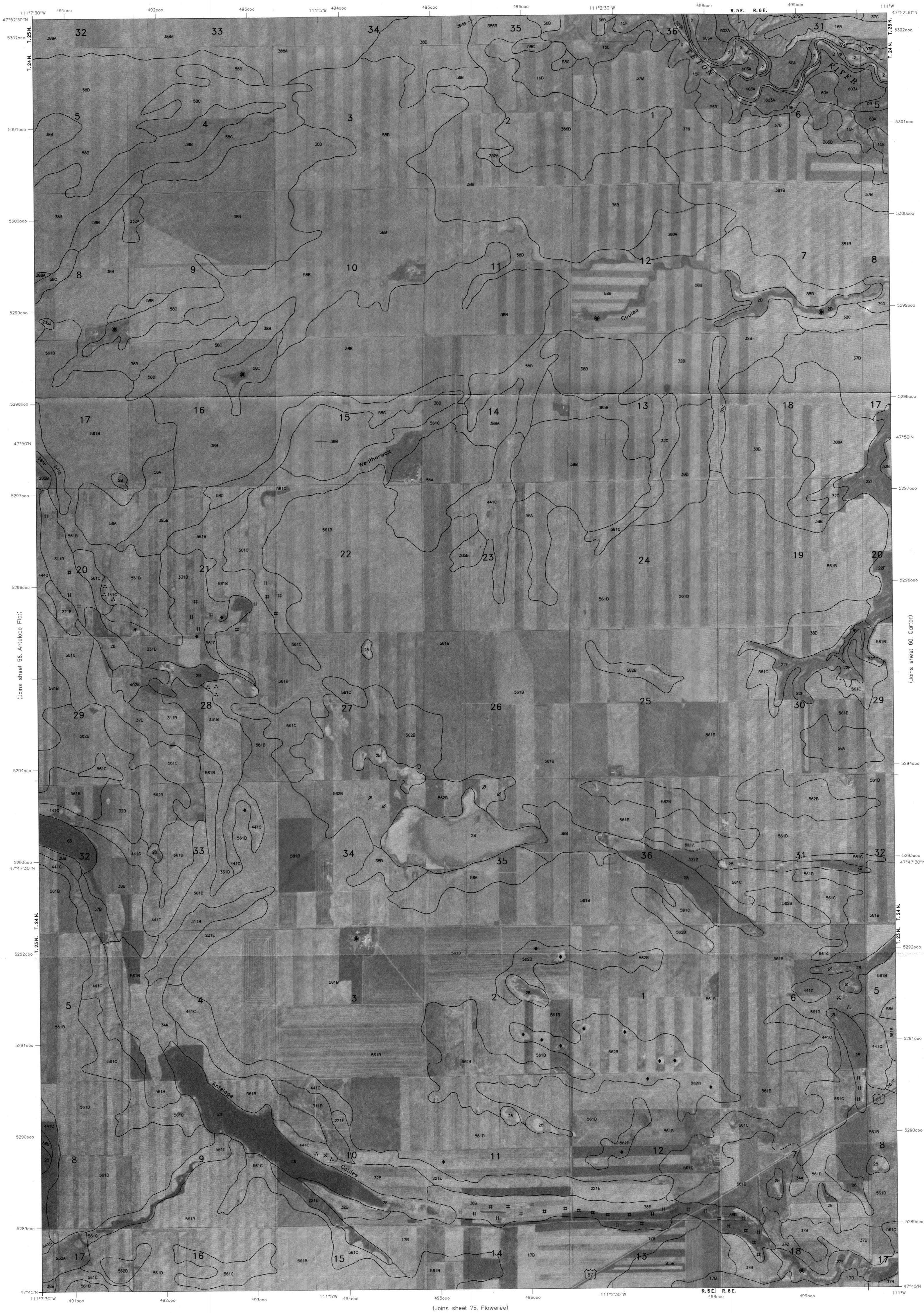
CHOUTEAU COUNTY AREA, MONTANA
ANTELOPE FLAT QUADRANGLE
SHEET NUMBER 58
7.5 MINUTE SERIES



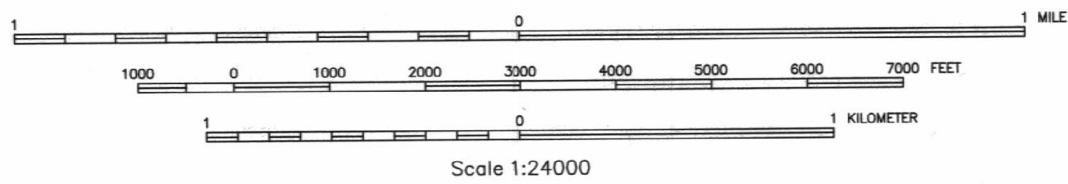
Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 58 OF 106
CHOUTEAU COUNTY AREA, MONTANA
ANTELOPE FLAT QUADRANGLE

(Joins sheet 43, Dent Bridge NE)



(Joins sheet 75, Floweree)

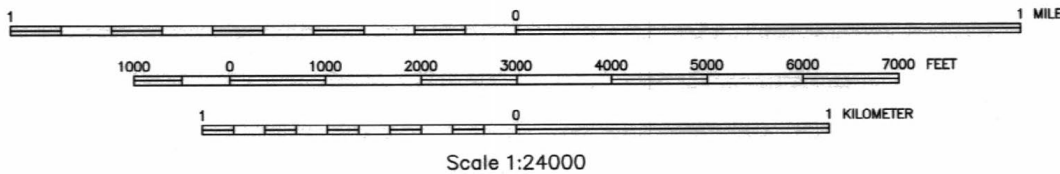


This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 59 OF 106
CHOUTEAU COUNTY AREA, MONTANA
ANTELOPE LAKE QUADRANGLE

(Joins sheet 44, Apple School)



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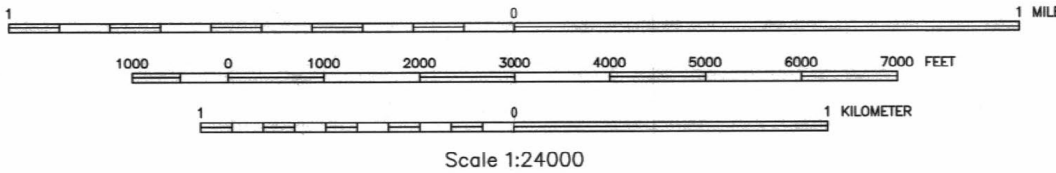
Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum



(Joins sheet 45, Carter NE)



(Joins sheet 77, Rice Reservoir)



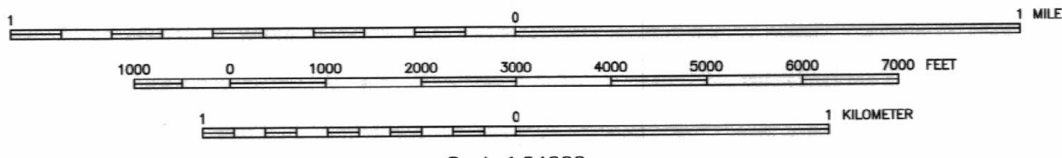
This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

(Joins sheet 46, Fort Benton NW)



(Joins sheet 78, Shonkin NW)



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Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 62 OF 106
CHOUTEAU COUNTY AREA, MONTANA
FORT BENTON QUADRANGLE

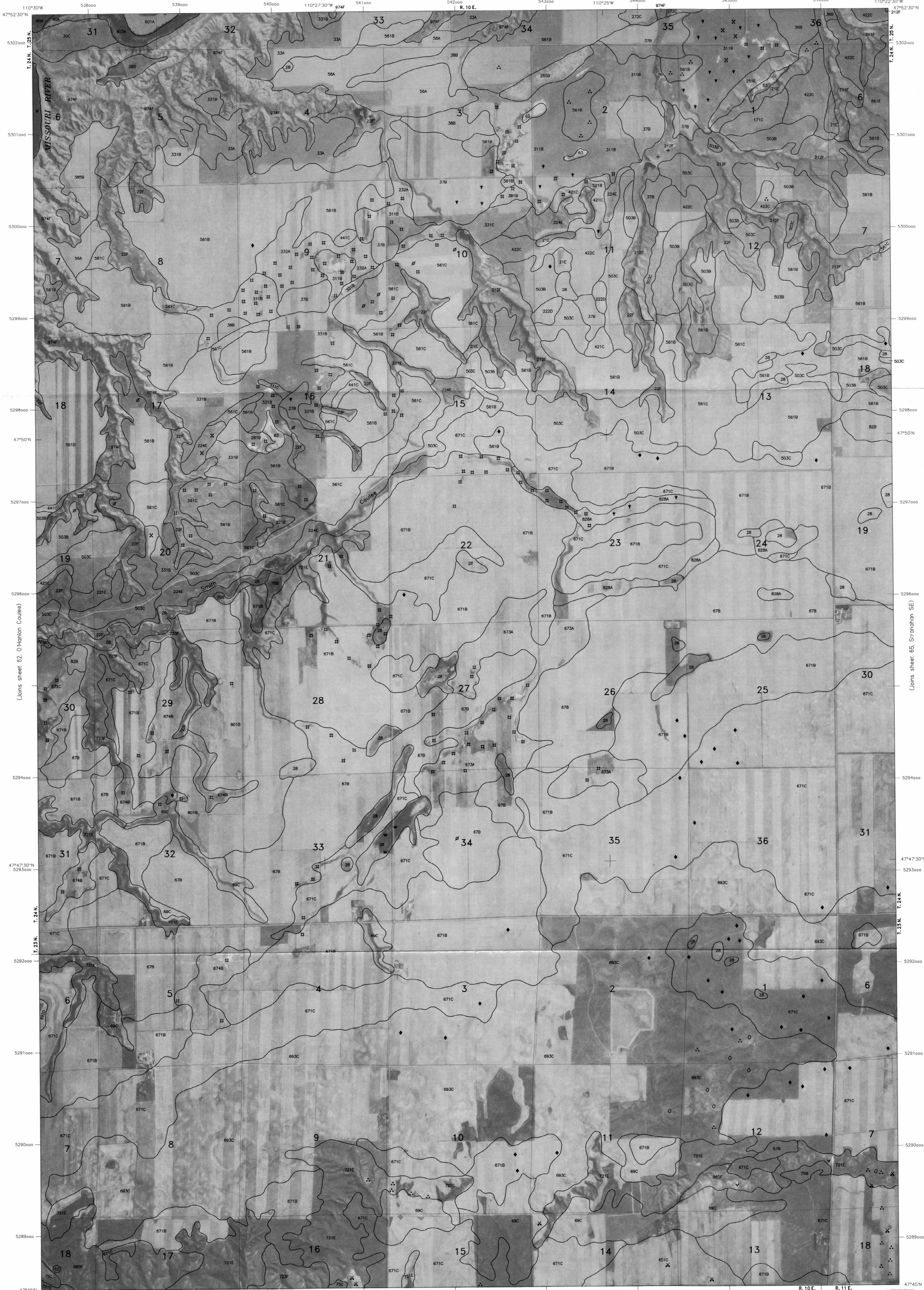
CHOUTEAU COUNTY AREA, MONTANA
O'HANLON COULEE QUADRANGLE
SHEET NUMBER 63
7.5 MINUTE SERIES

[illegible]

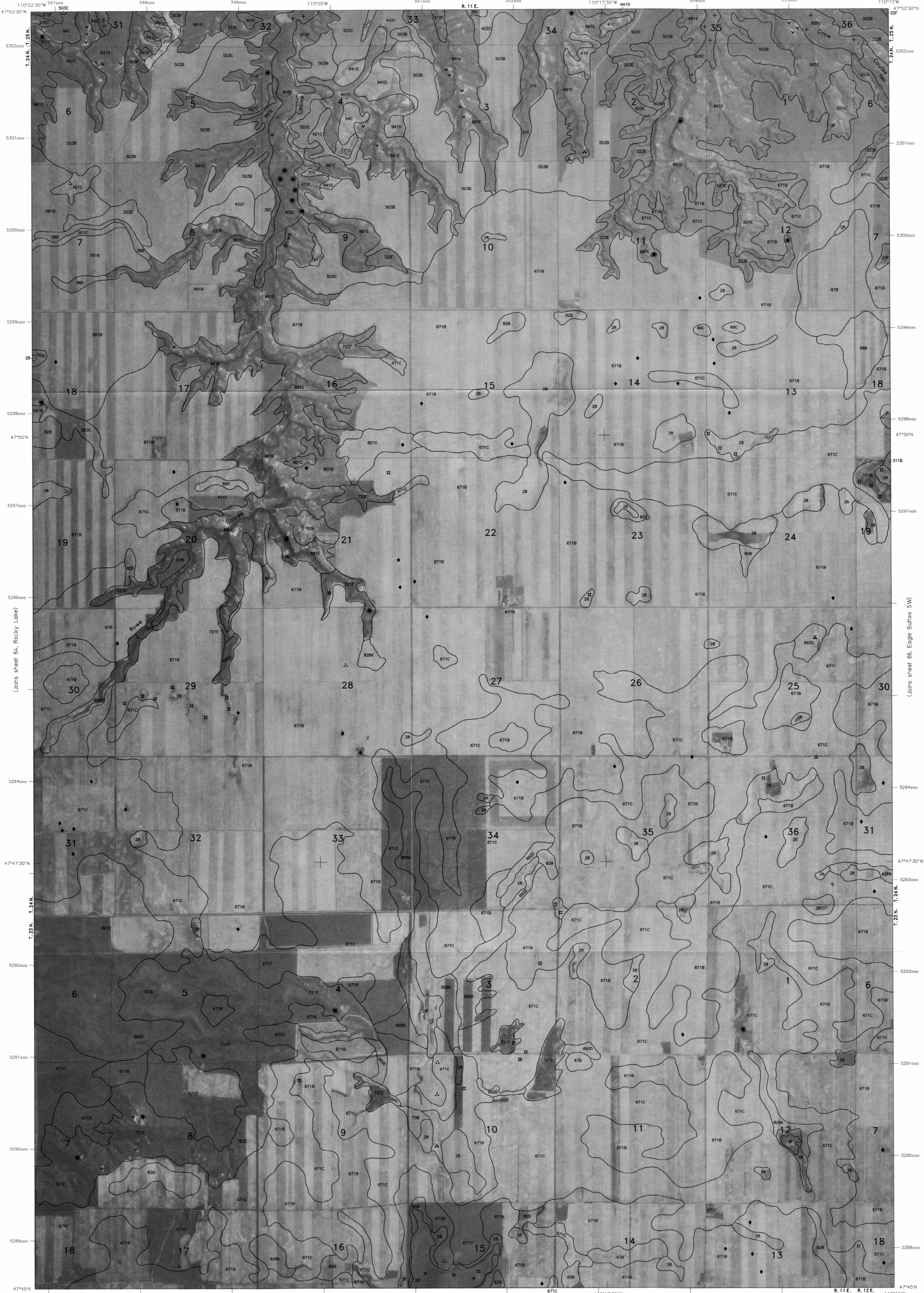
Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 63 OF 106
CHOUTEAU COUNTY AREA, MONTANA
O'HANLON COULEE QUADRANGLE

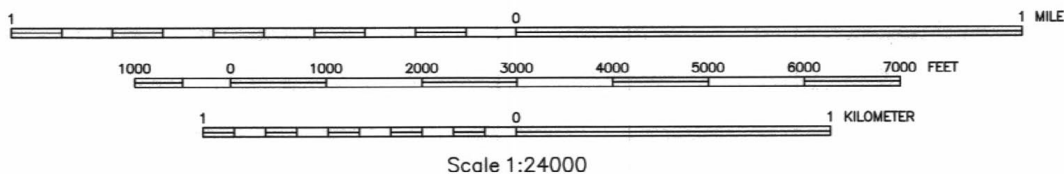
(Joins sheet 48, Loma East)



(Joins sheet 49, Stranahan)



(Joins sheet 81, Geraldine NE)

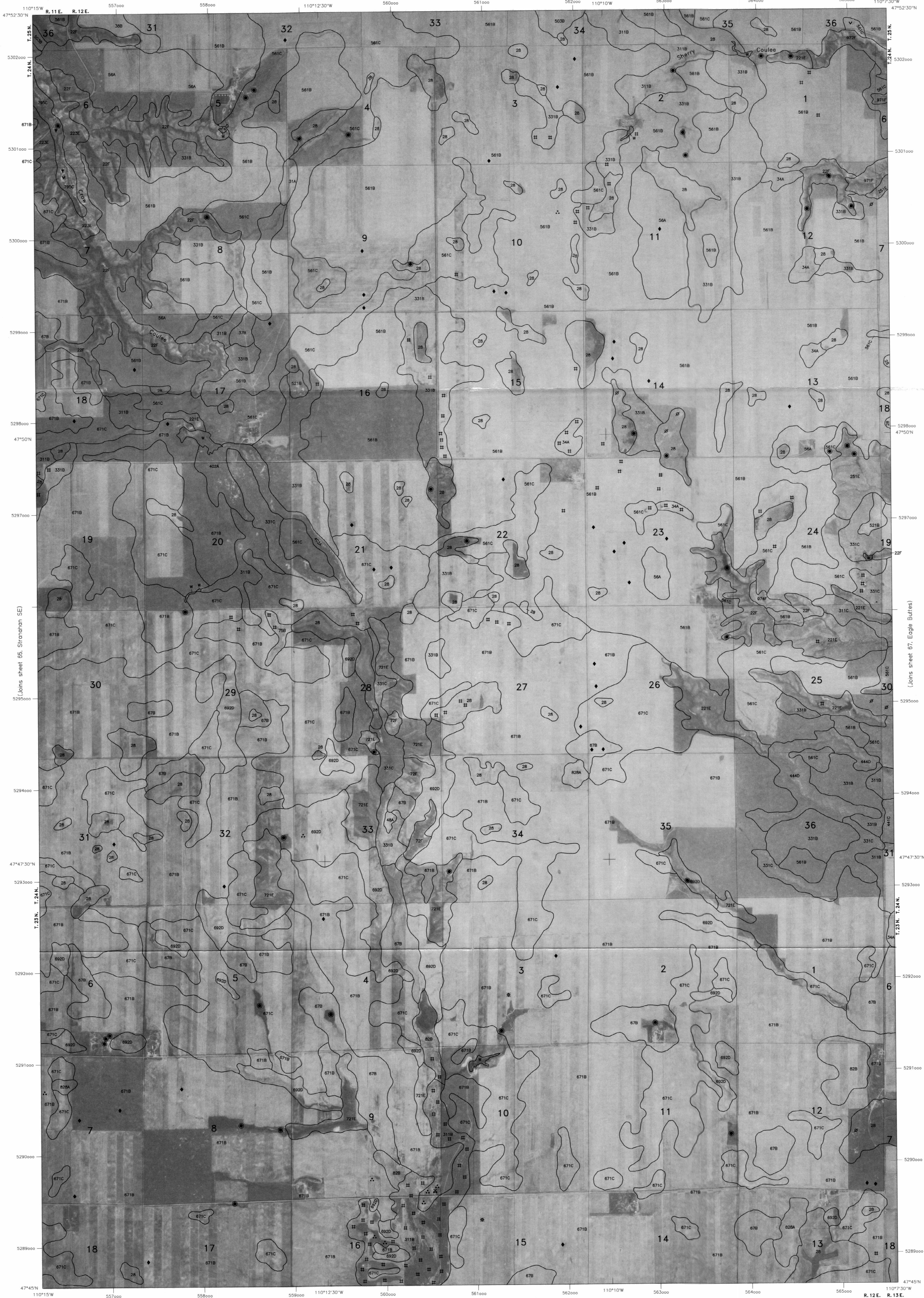


This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

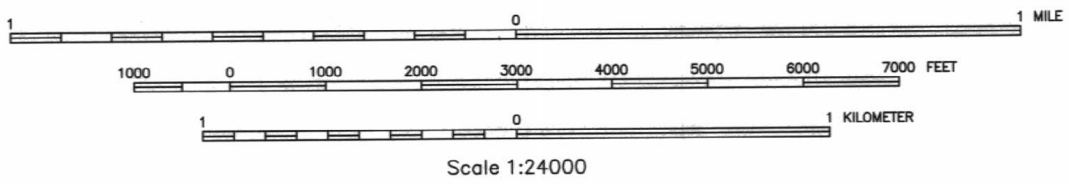
Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 65 OF 106
CHOUTEAU COUNTY AREA, MONTANA
STRANAHAN SE QUADRANGLE

(Joins sheet 50, Big Bend School)



(Joins sheet 82, Dammel Reservoir)

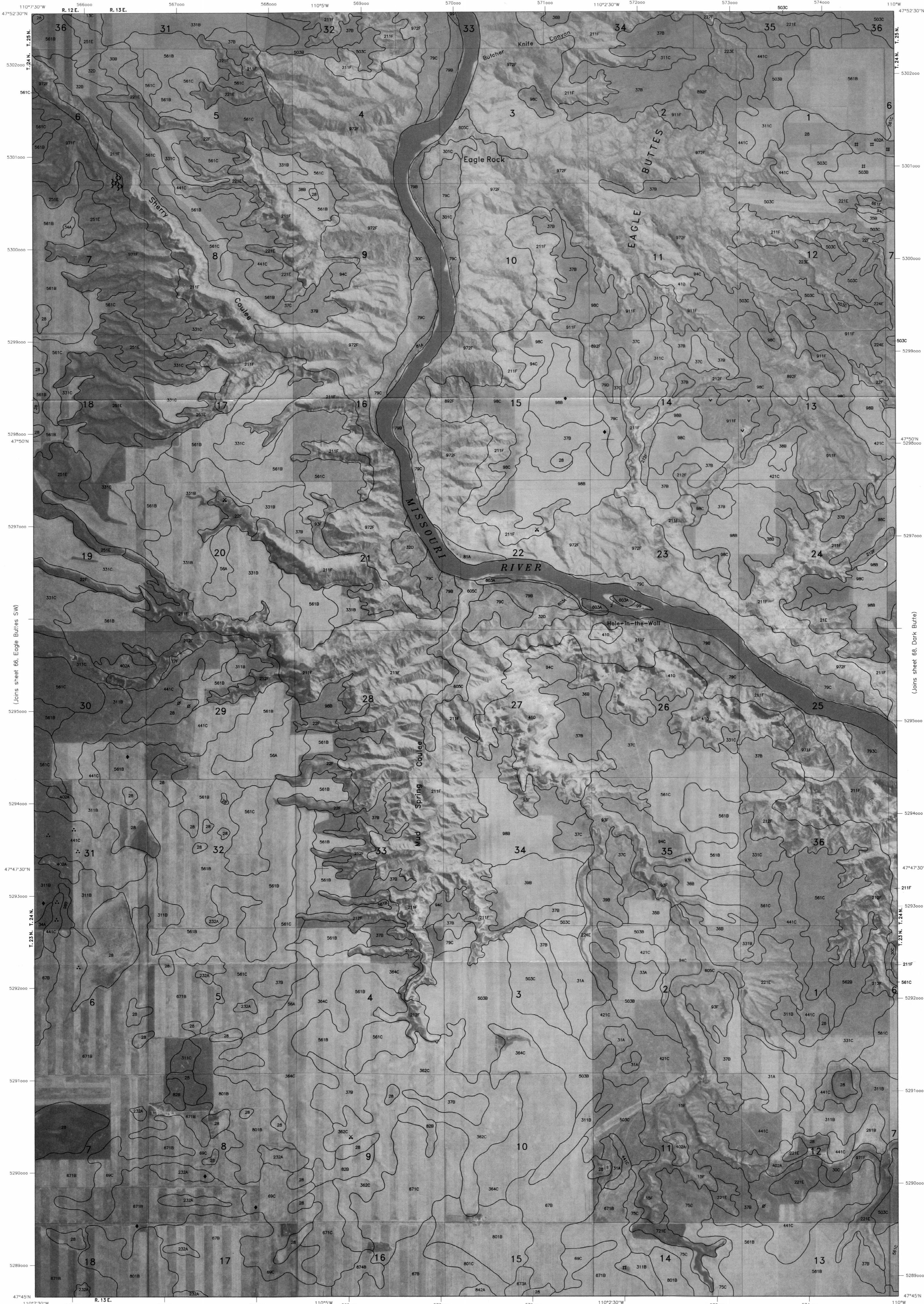


This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 66 OF 106
CHOUTEAU COUNTY AREA, MONTANA
EAGLE BUTTES SW QUADRANGLE

(Joins sheet 51, Pilot Rock)

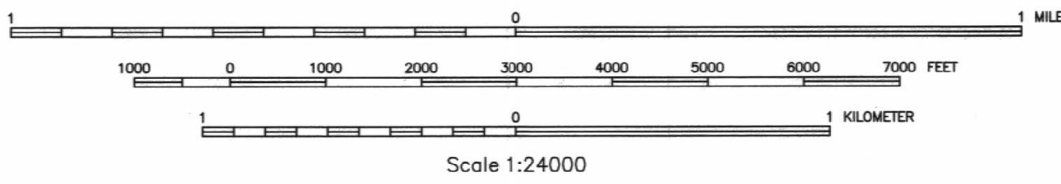


(Joins sheet 66, Eagle Buttes SW)

(Joins sheet 68, Dark Butte)

(Joins sheet 83, Square Butte NE)

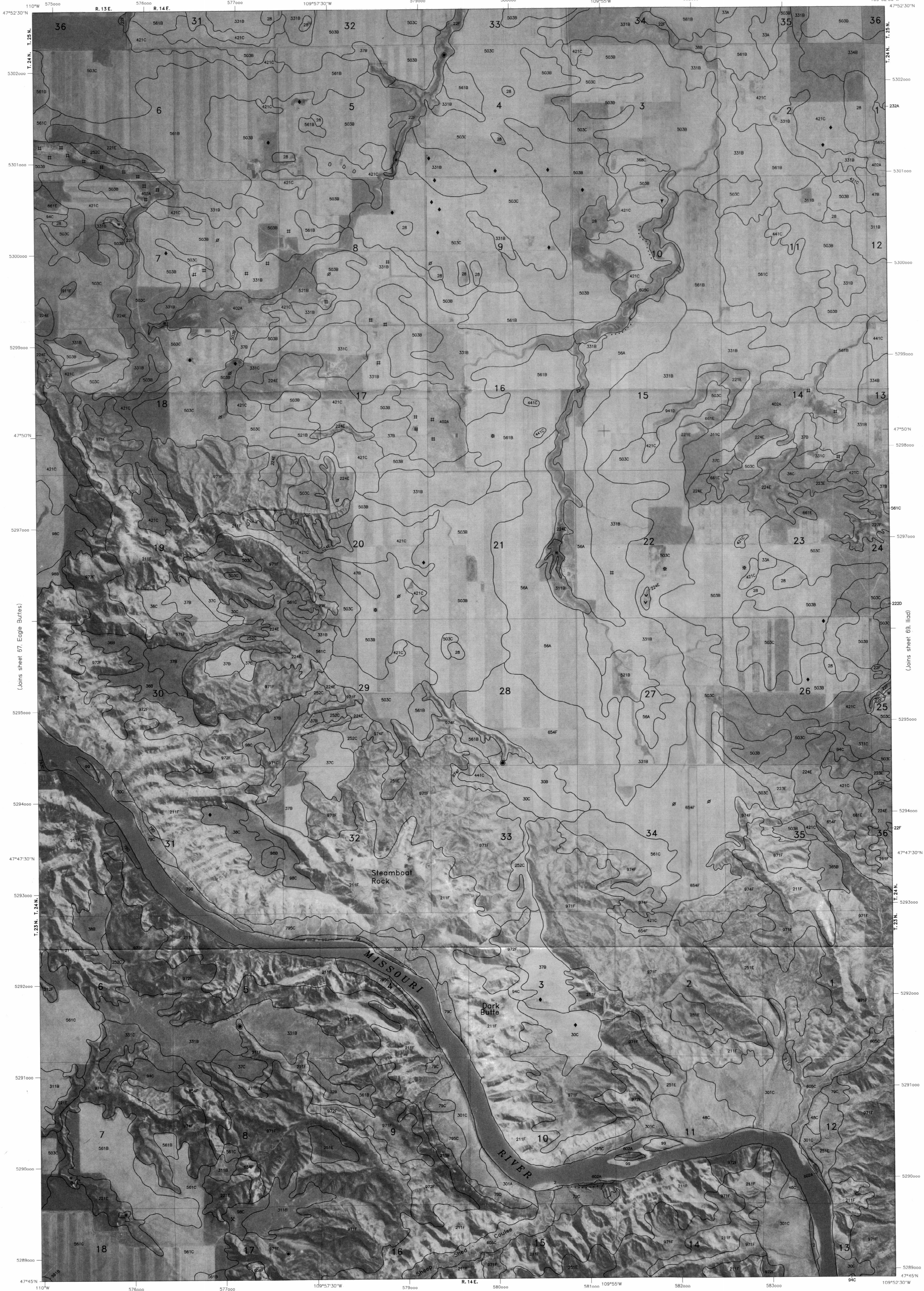
This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.



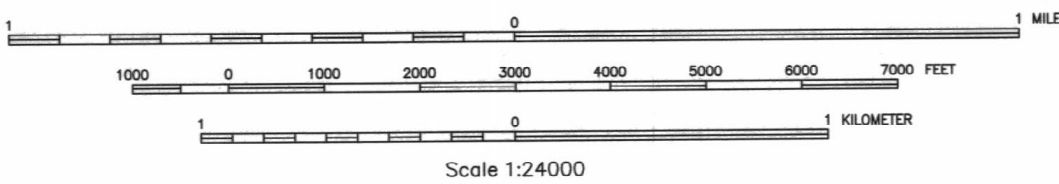
Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 67 OF 106
CHOUTEAU COUNTY AREA, MONTANA
EAGLE BUTTES QUADRANGLE

(Joins sheet 52, Eaglelan NW)



(Joins sheet 84, Last Chance Bench)

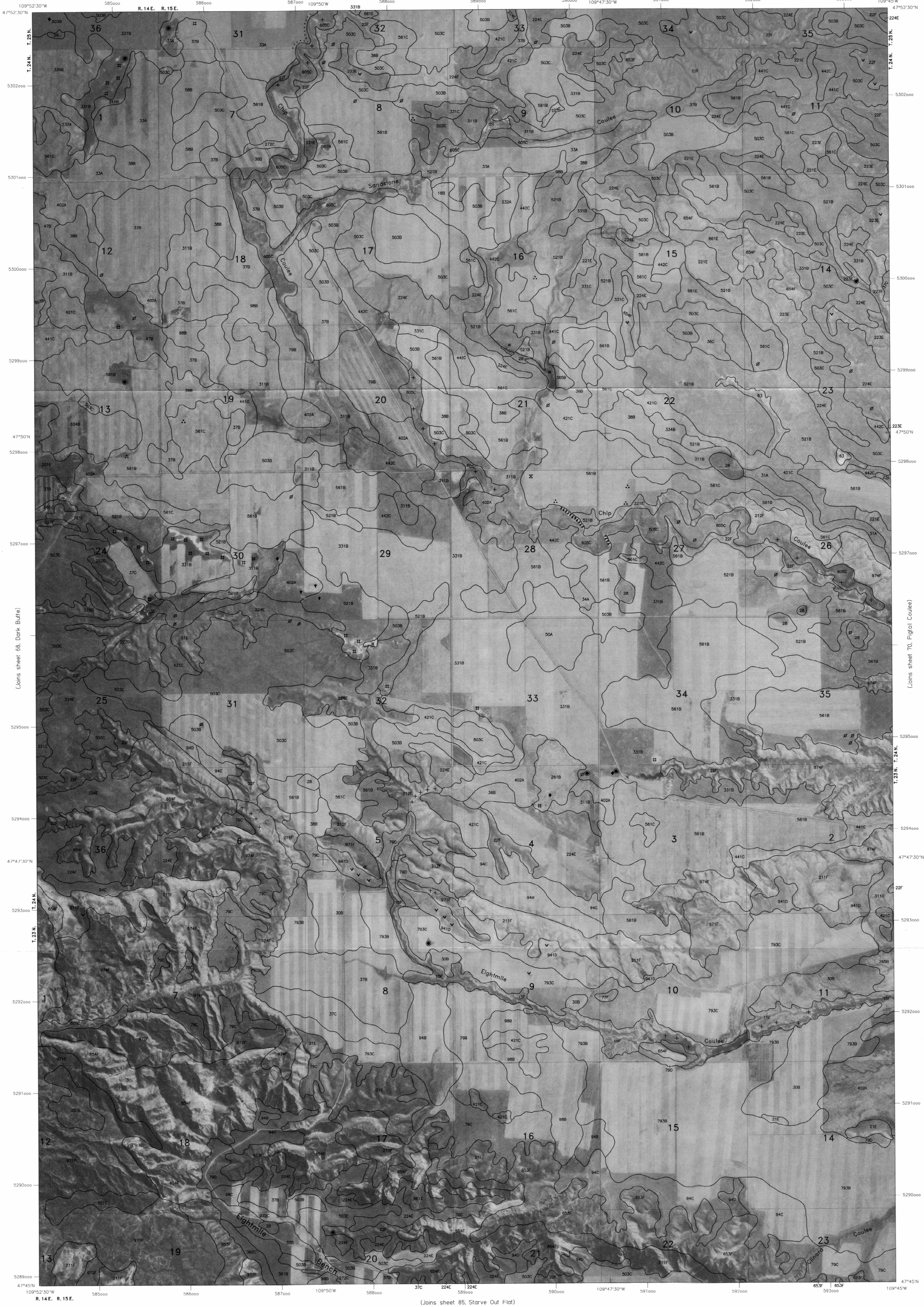


This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 68 OF 106
CHOUTEAU COUNTY AREA, MONTANA
DARK BUTTE QUADRANGLE

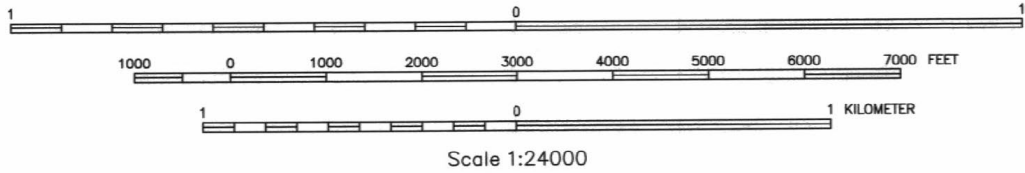
(Joins sheet 53, Selfort Reservoir)



(Joins sheet 88, Dark Butte)

(Joins sheet 70, Pigtail Coulee)

(Joins sheet 85, Starve Out Flat)



This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 69 OF 106
CHOUTEAU COUNTY AREA, MONTANA
ILIAD QUADRANGLE

CHOUTEAU COUNTY AREA, MONTANA
PIGTAIL COULEE QUADRANGLE
SHEET NUMBER 70
7.5 MINUTE SERIES

SHEET NUMBER 70 OF 106
CHOUTEAU COUNTY AREA, MONTANA
PIGTAIL COULEE QUADRANGLE

CHOUTEAU COUNTY AREA, MONTANA
CHASE HILL QUADRANGLE
SHEET NUMBER 71
7.5 MINUTE SERIES

(Joins sheet 55, Eskay NE)



Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

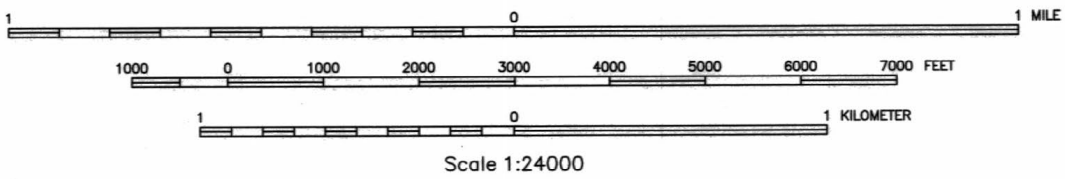


SHEET NUMBER 71 OF 106
CHOUTEAU COUNTY AREA, MONTANA
CHASE HILL QUADRANGLE

(Joins sheet 56, Timber Coulee South)



This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.



Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum



SHEET NUMBER 72 OF 106
CHOUTEAU COUNTY AREA, MONTANA
BENTON LAKE WEST QUADRANGLE

CHOUTEAU COUNTY AREA, MONTANA
BENTON LAKE EAST QUADRANGLE
SHEET NUMBER 73
7.5 MINUTE SERIES

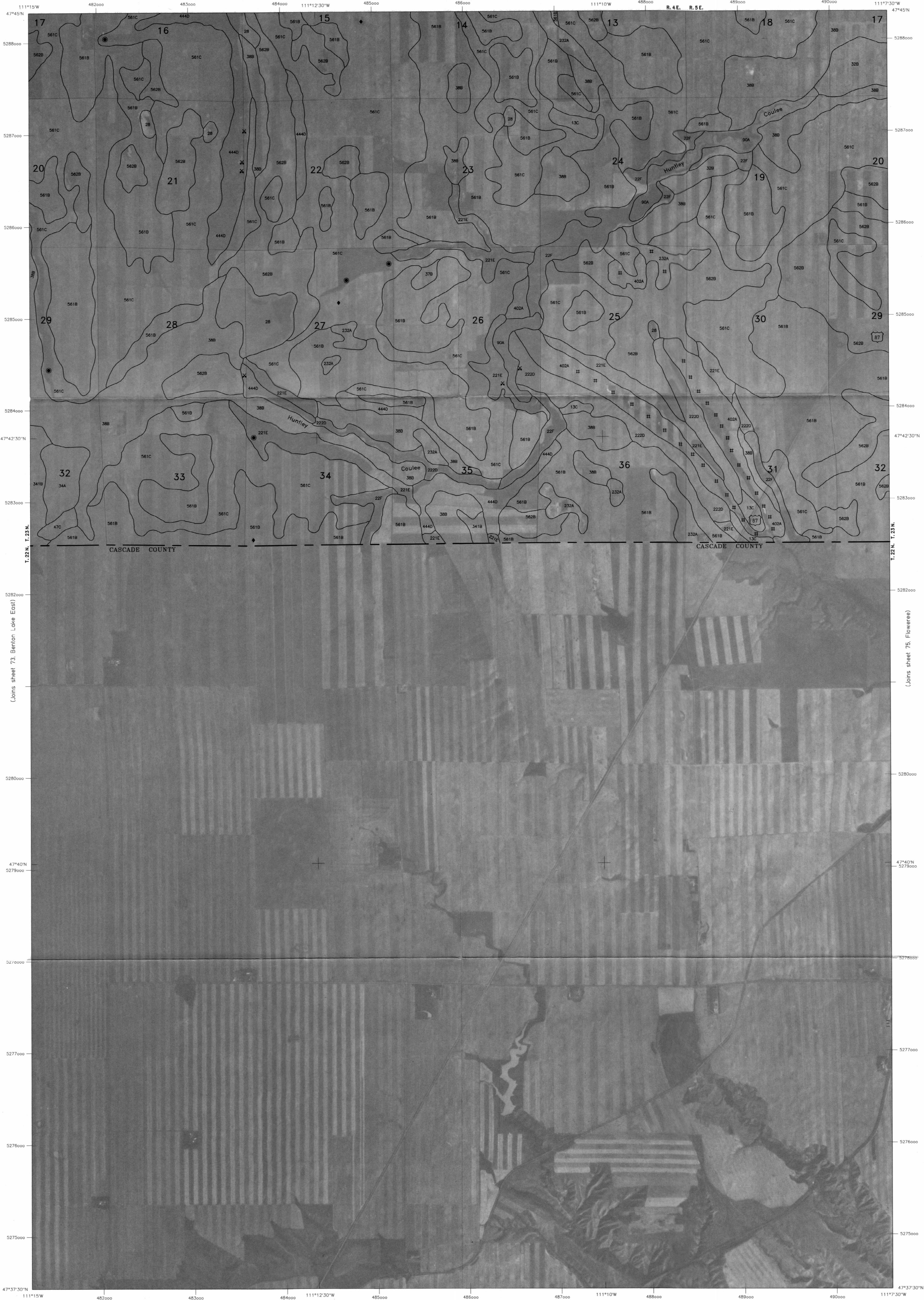
(Joins sheet 57, Sheep Coulee Springs)



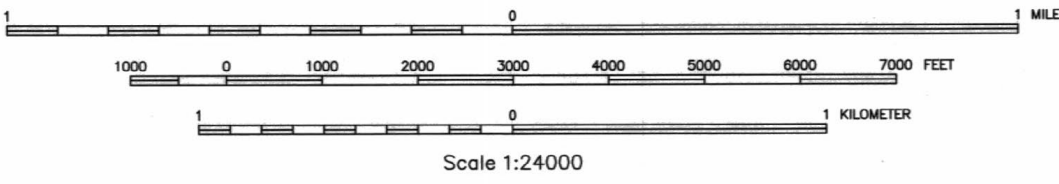
Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 73 OF 106
CHOUTEAU COUNTY AREA, MONTANA
BENTON LAKE EAST QUADRANGLE

(Joins sheet 58, Antelope Flat)



This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.



Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

CHOUTEAU COUNTY AREA, MONTANA
FLOWEREE QUADRANGLE
SHEET NUMBER 75
7.5 MINUTE SERIES

1 MILE

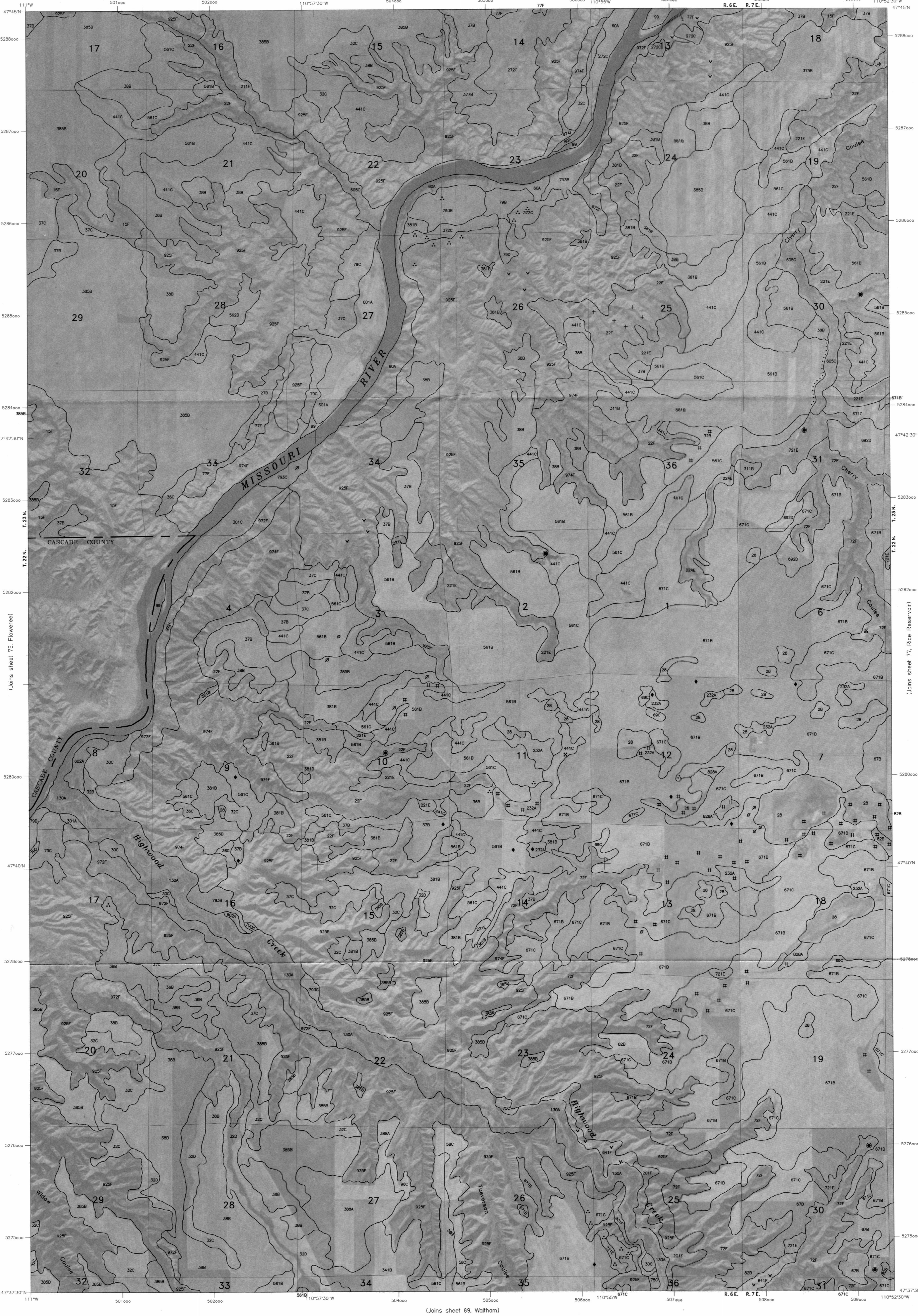
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0 1 KILOMETER

Scale 1:24000

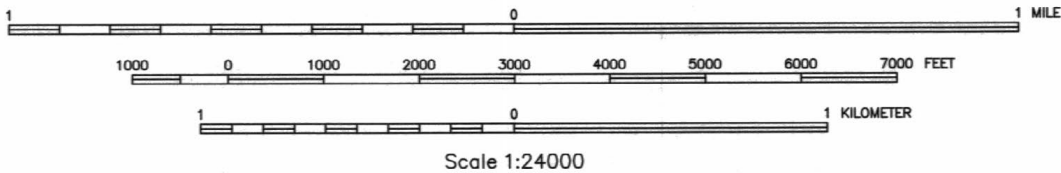
SHEET NUMBER 75 OF 106
CHOUTEAU COUNTY AREA, MONTANA
FLOWEREE QUADRANGLE

(Joins sheet 60, Carter)



(Joins sheet 75, Flowerse)

(Joins sheet 77, Rice Reservoir)



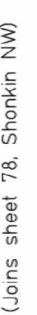
This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 76 OF 106
CHOUTEAU COUNTY AREA, MONTANA
LANDER CROSSING QUADRANGLE

CHOUTEAU COUNTY AREA, MONTANA
RICE RESERVOIR QUADRANGLE
SHEET NUMBER 77
7.5 MINUTE SERIES

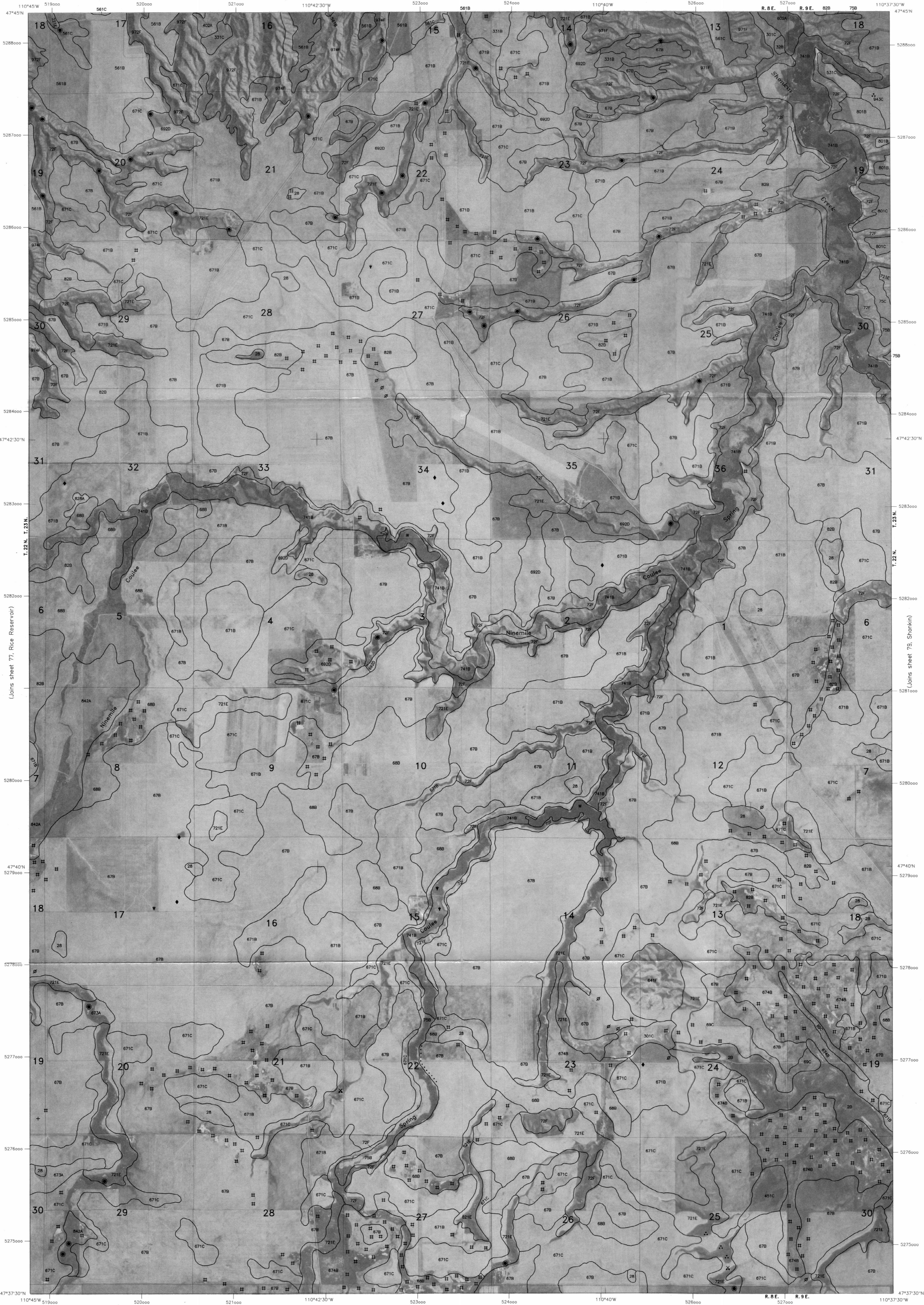
R. 7F. R. 8F.



Scale 1:24000

SHEET NUMBER 77 OF 106
CHOUTEAU COUNTY AREA, MONTANA
RICE RESERVOIR QUADRANGLE

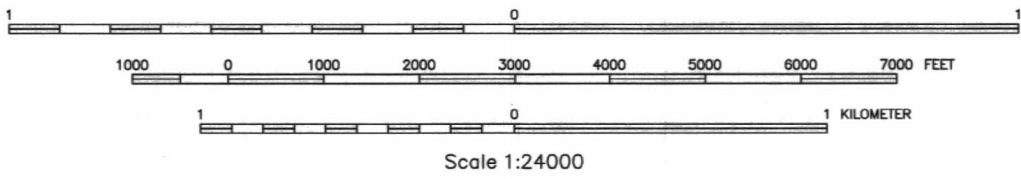
(Joins sheet 62, Fort Benton)



(Joins sheet 77, Rice Reservoir)

(Joins sheet 79, Shonkin)

(Joins sheet 91, Big Sag)



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Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum



(Joins sheet 63, O'Hanlon Coulee)



(Joins sheet 92, Carter Mountain)

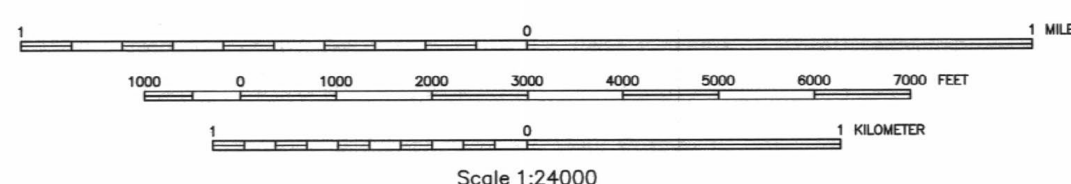
This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 79 OF 106
CHOUTEAU COUNTY AREA, MONTANA
SHONKIN QUADRANGLE

CHOUTEAU COUNTY AREA, MONTANA
MONTAGUE QUADRANGLE
SHEET NUMBER 80
7.5 MINUTE SERIES

(Joins sheet 93, Lepleys Creek)

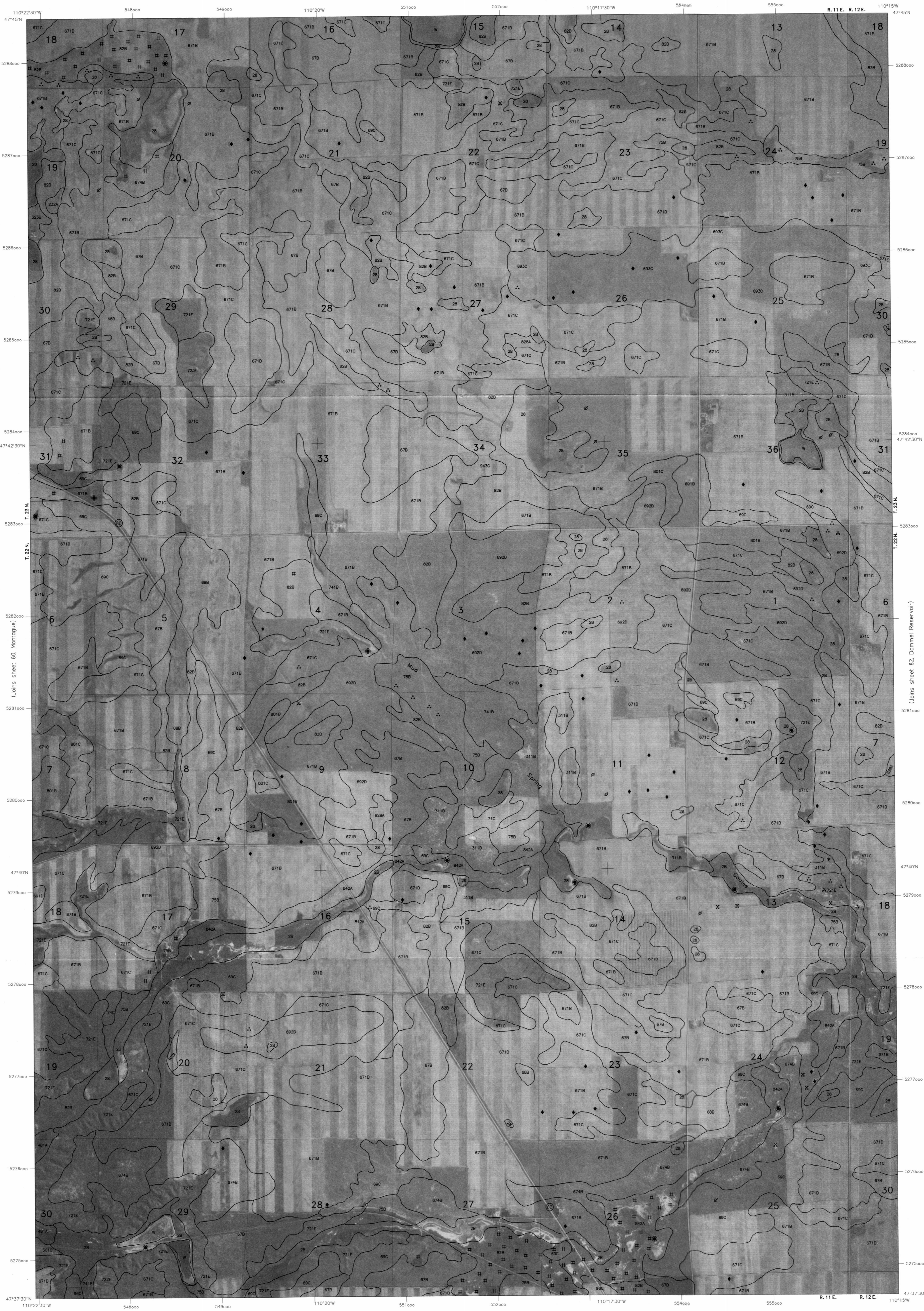


Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 80 OF 106
CHOUTEAU COUNTY AREA, MONTANA
MONTAGUE QUADRANGLE

CHOUTEAU COUNTY AREA, MONTANA
GERALDINE NE QUADRANGLE
SHEET NUMBER 81
7.5 MINUTE SERIES

(Joins sheet 65, Stranahan SE)



Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

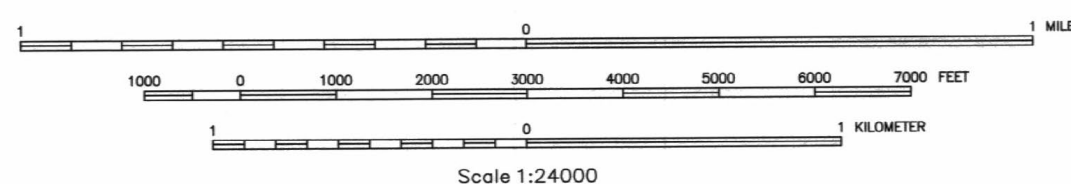
SHEET NUMBER 81 OF 106
CHOUTEAU COUNTY AREA, MONTANA
GERALDINE NE QUADRANGLE



This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

CHOUTEAU COUNTY AREA, MONTANA
SQUARE BUTTE NE QUADRANGLE
SHEET NUMBER 83
7.5 MINUTE SERIES

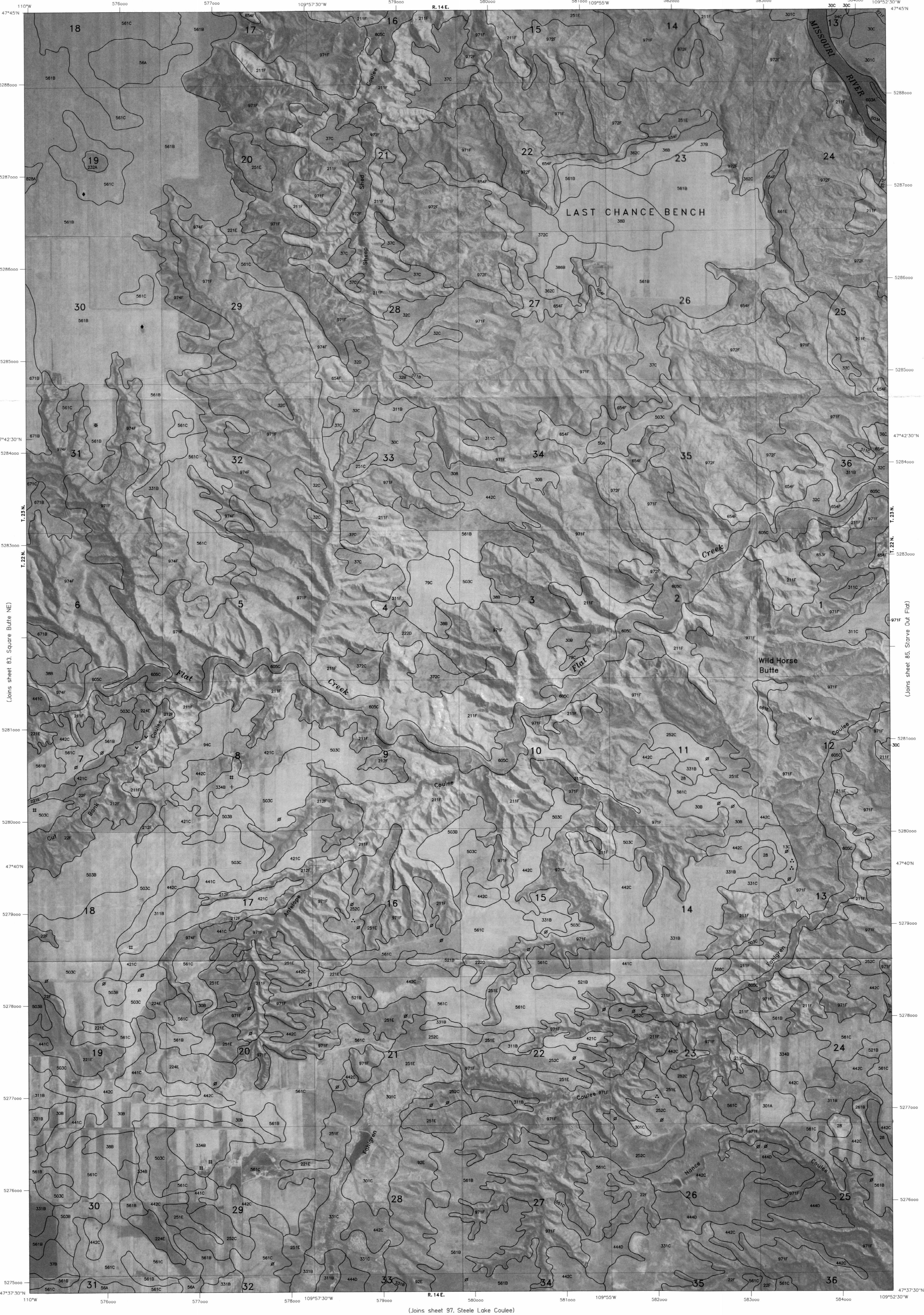
R. 13 E. R. 14 E.



Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

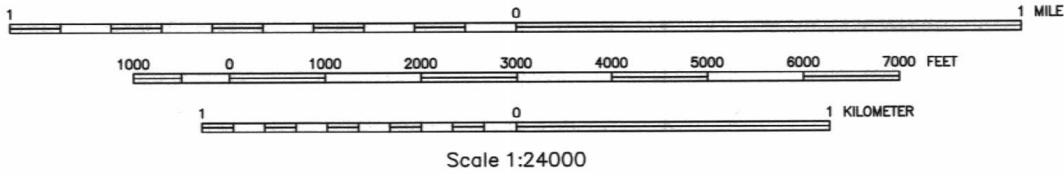
SHEET NUMBER 83 OF 106
CHOUTEAU COUNTY AREA, MONTANA
SQUARE BUTTE NE QUADRANGLE

(Joins sheet 68, Dark Butte)



(Joins sheet 97, Steele Lake Coulee)

This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

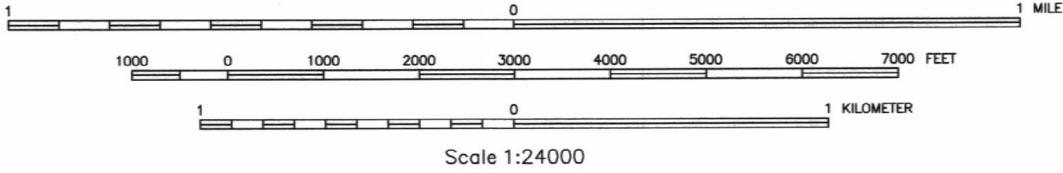


Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum





This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.



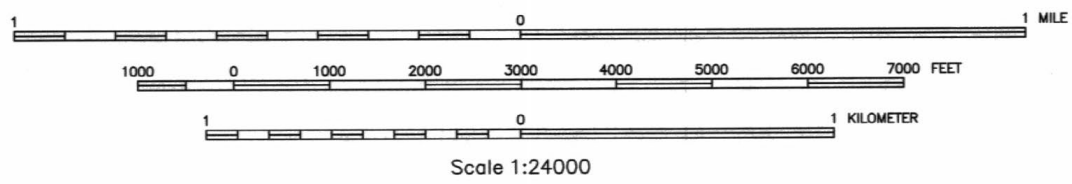
Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

(Joins sheet 70, Pigtail Coulee)



(Joins sheet 85, Starve Out Flat)

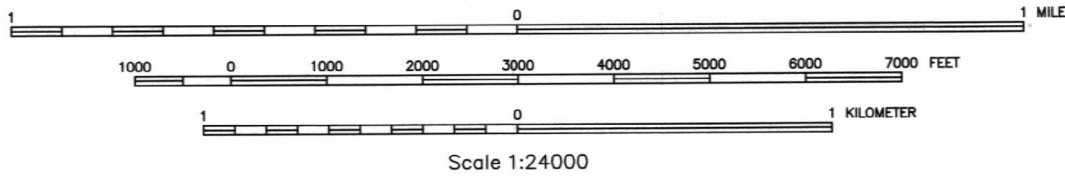
(Joins sheet 87, Council Island)



This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.



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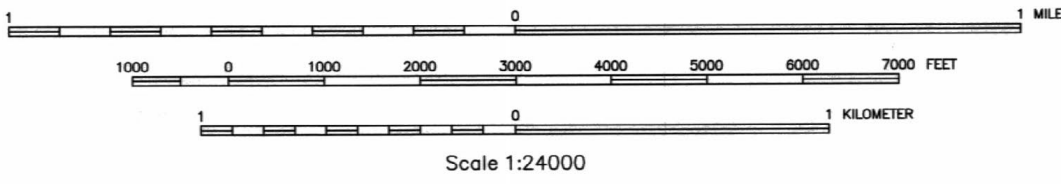
Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum



(Joins sheet 75, Floweree)



This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.



Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

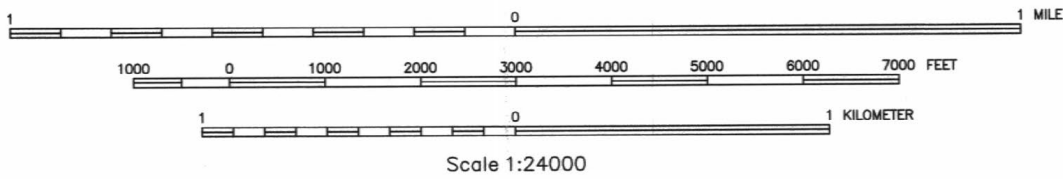


SHEET NUMBER 88 OF 106
CHOUTEAU COUNTY AREA, MONTANA
MORONY DAM QUADRANGLE

(Joins sheet 76, Lander Crossing)



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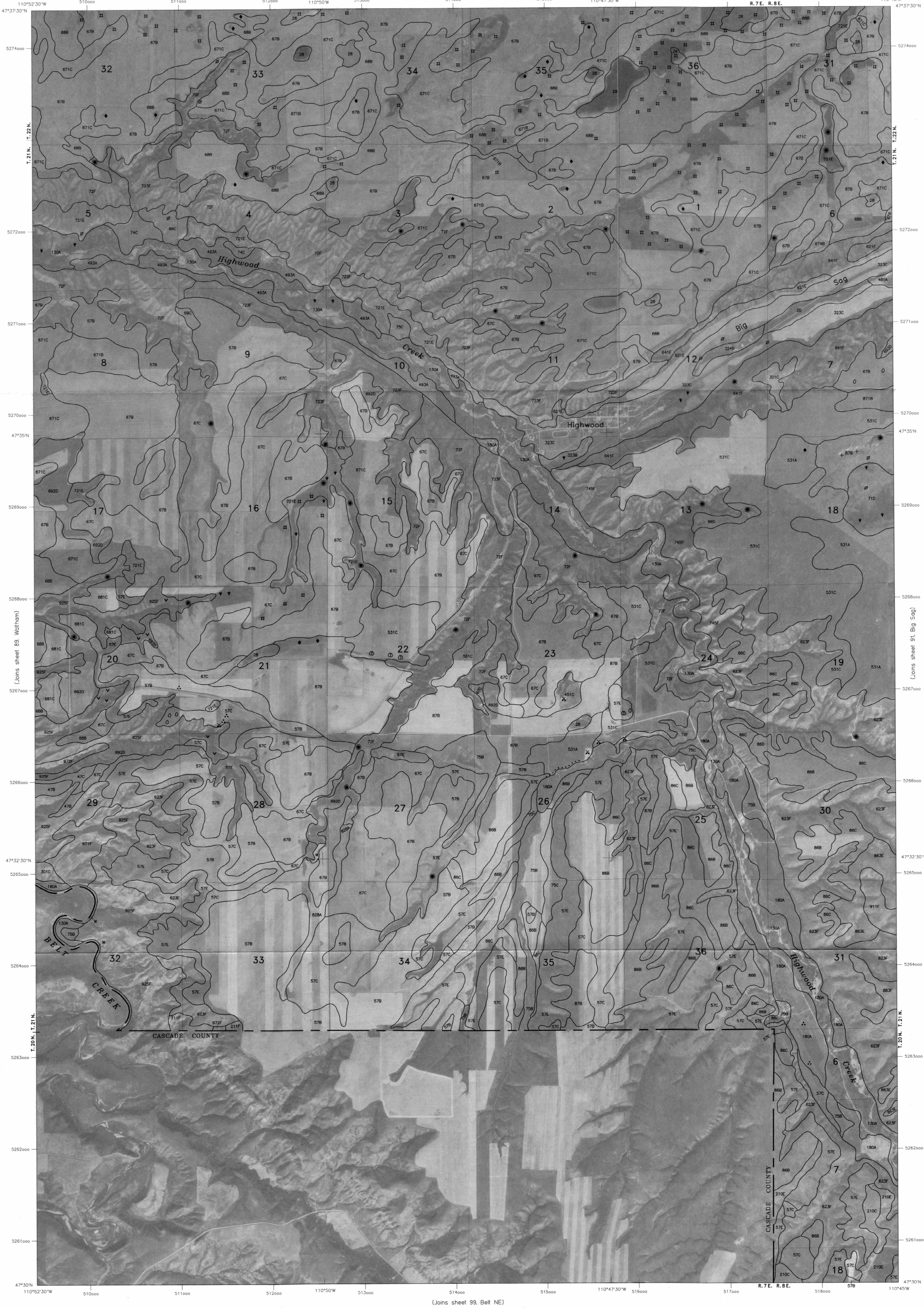


Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum



SHEET NUMBER 89 OF 106
CHOUTEAU COUNTY AREA, MONTANA
WALTHAM QUADRANGLE

(Joins sheet 77, Rice Reservoir)

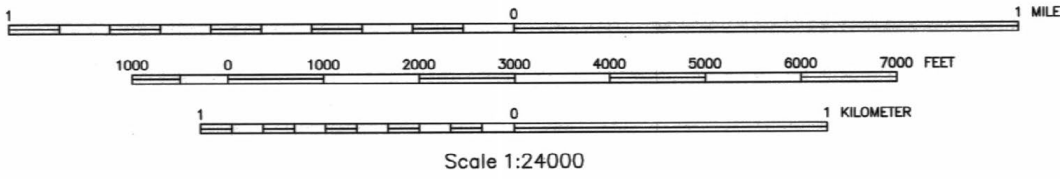


(Joins sheet 89, Waltham)

(Joins sheet 91, Big Sag)

(Joins sheet 99, Belt NE)

This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.



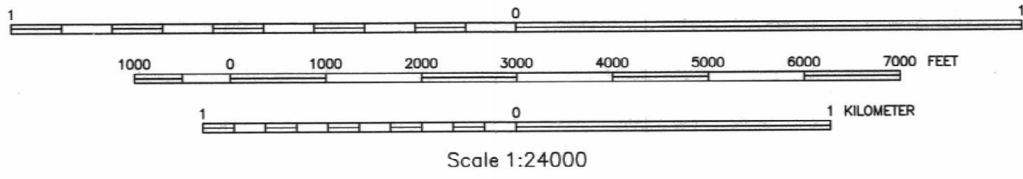
Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum



(Joins sheet 78, Shonkin NW)



This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

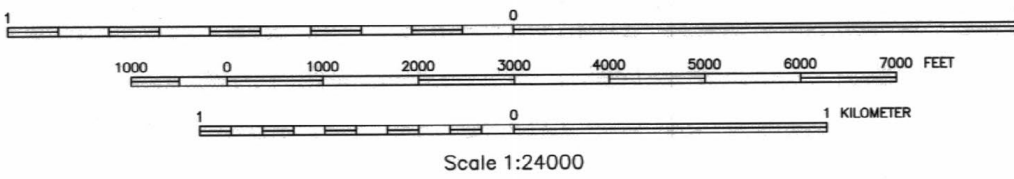


Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

(Joins sheet 79, Shonkin)



(Joins sheet 101, Arrow Peak)



This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

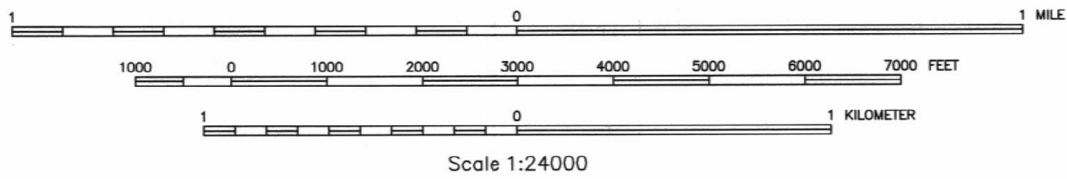
Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 92 OF 106
CHOUTEAU COUNTY AREA, MONTANA
CARTER MOUNTAIN QUADRANGLE

(Joins sheet 80, Montague)



(Joins sheet 102, Palisade Butte)



This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 93 OF 106
CHOUTEAU COUNTY AREA, MONTANA
LEPLEYS CREEK QUADRANGLE

CHOUTEAU COUNTY AREA, MONTANA
GERALDINE QUADRANGLE
SHEET NUMBER 94
7.5 MINUTE SERIES

This is a detailed topographic map of the Geraldine area. The map features a grid with coordinates ranging from 110°22'30"W to 110°15'W and 47°37'30"N to 47°30'N. Key geographical features include Kingsbury Lake, Kingsbury Creek, and various numbered sections (1-36). The map also shows contour lines, elevation markers, and labels for 'Joins sheet 93, Leplays Creek' and 'Joins sheet 95, Square Butte'.

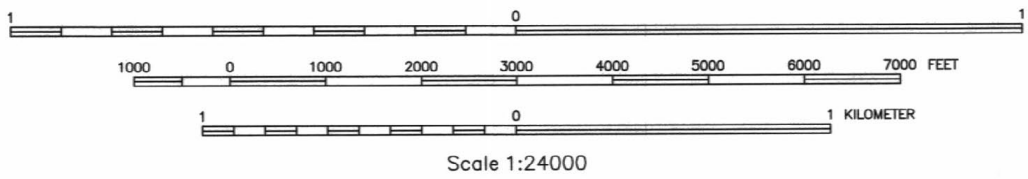


Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 94 OF 106
CHOUTEAU COUNTY AREA, MONTANA
GERALDINE QUADRANGLE

(Joins sheet 82, Dammel Reservoir)

R. 12 E. R. 13 E.



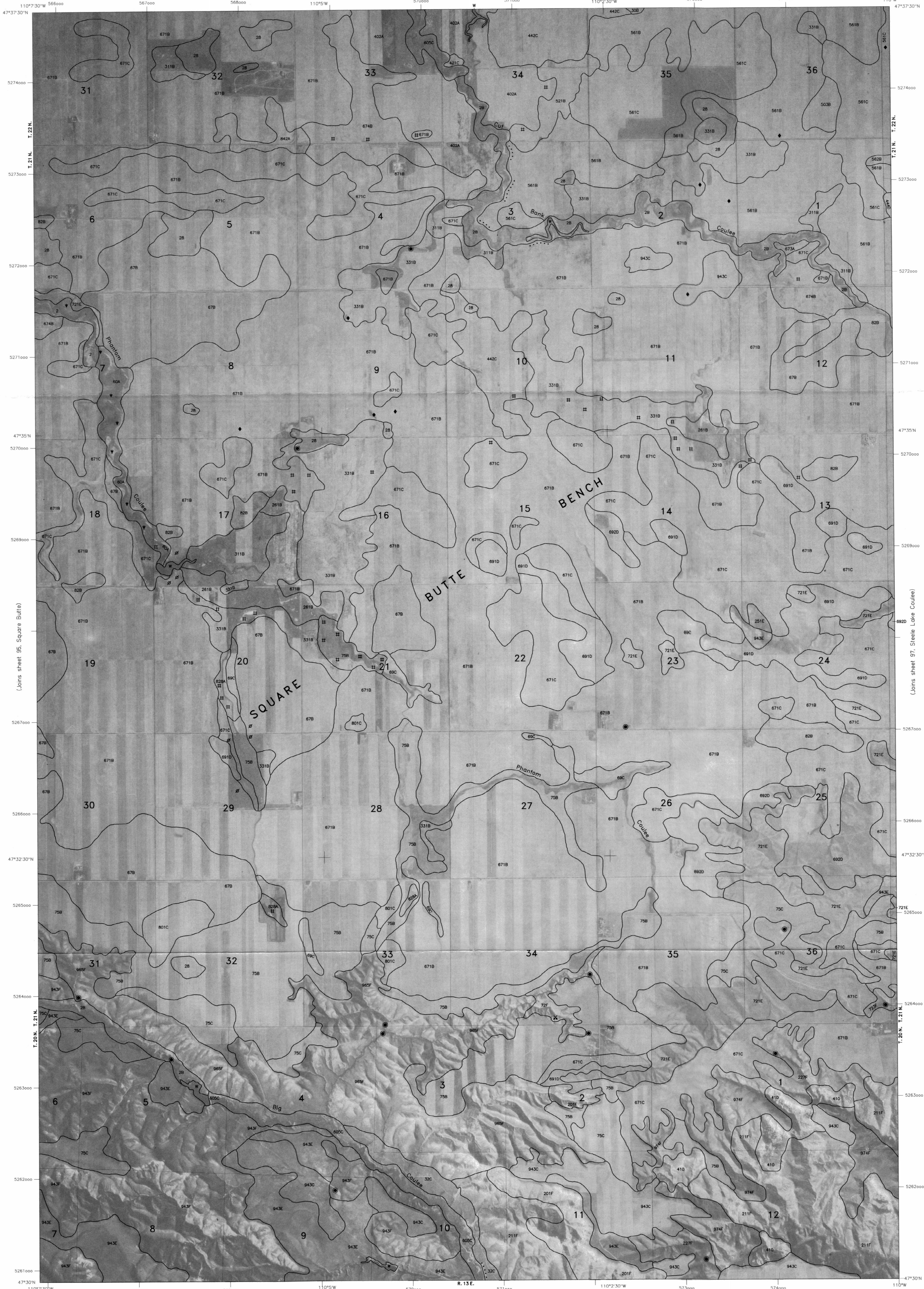
This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

SHEET NUMBER 95 OF 106
CHOUTEAU COUNTY AREA, MONTANA
SQUARE BUTTE QUADRANGLE

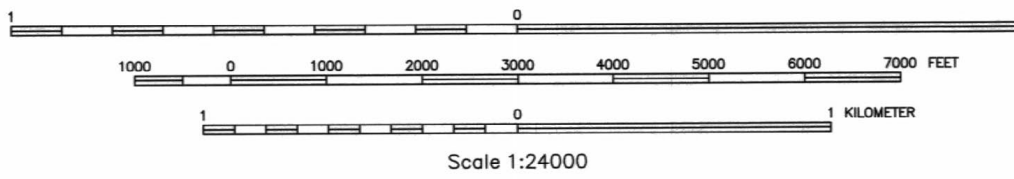
(Joins sheet 83, Square Butte NE)

R. 13 E. R. 14 E.
110°W



(Joins sheet 95, Square Butte)

(Joins sheet 97, Steele Lake Coulee)

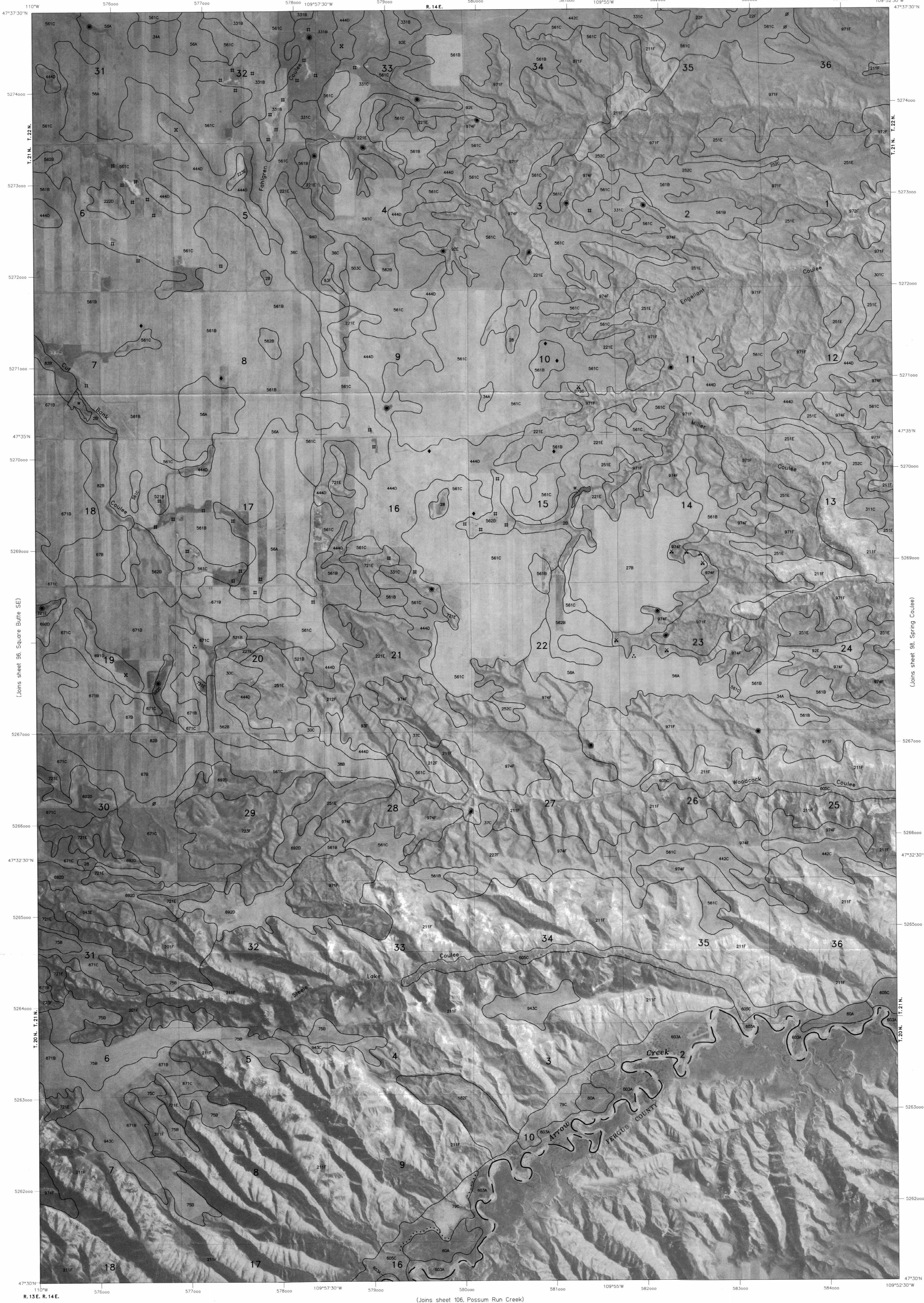


Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

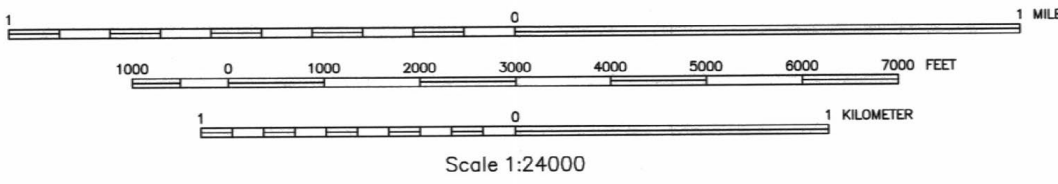
This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

SHEET NUMBER 96 OF 106
CHOUTEAU COUNTY AREA, MONTANA
SQUARE BUTTE SE QUADRANGLE

(Joins sheet 84, Last Chance Bench)



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Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum



SHEET NUMBER 97 OF 106
CHOUTEAU COUNTY AREA, MONTANA
STEELE LAKE COULEE QUADRANGLE

CHOUTEAU COUNTY AREA, MONTANA
SPRING COULEE QUADRANGLE
SHEET NUMBER 98
7.5 MINUTE SERIES



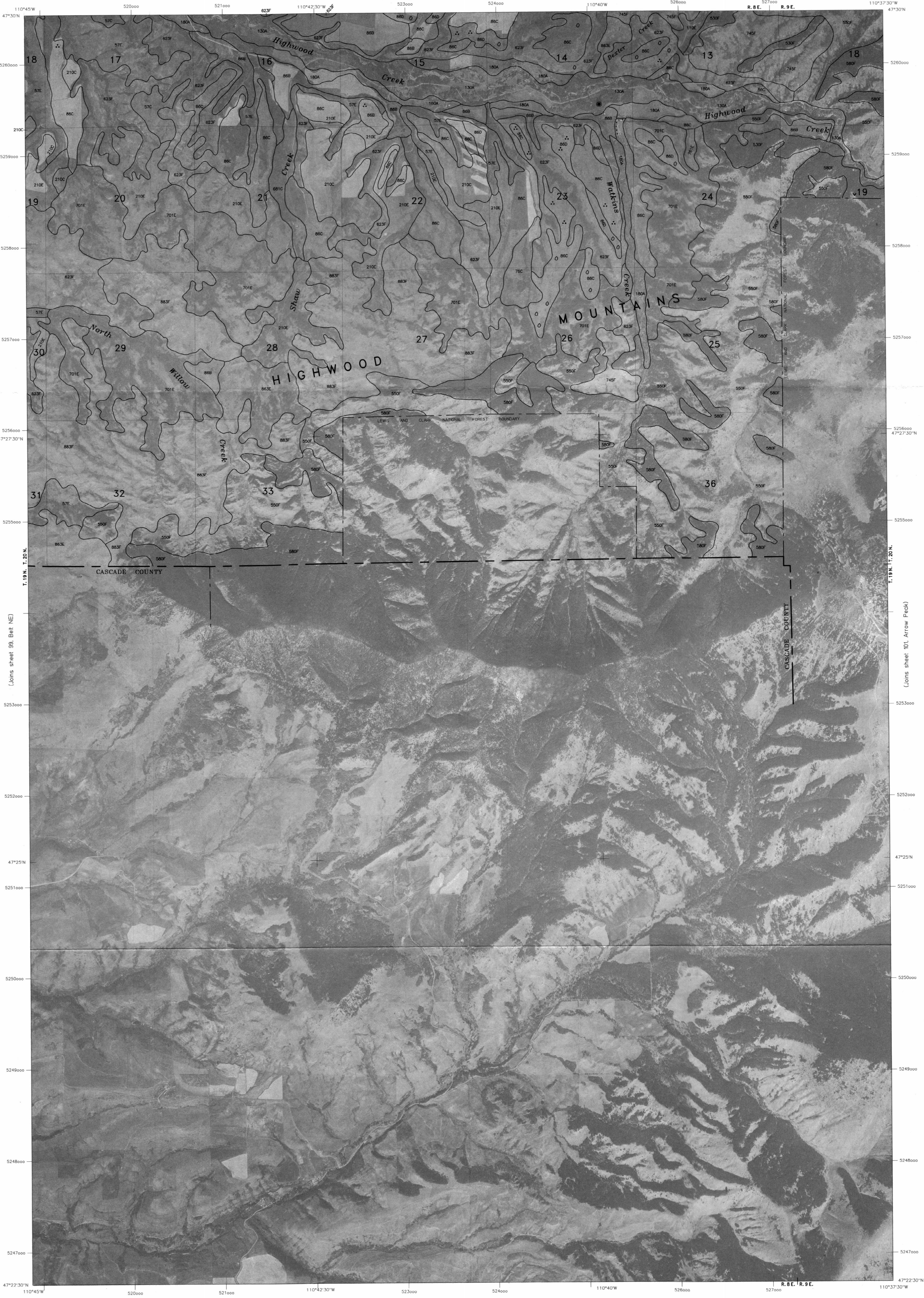
SHEET NUMBER 98 OF 106
CHOUTEAU COUNTY AREA, MONTANA
SPRING COULEE QUADRANGLE

Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

CHOUTEAU COUNTY AREA, MONTANA
BELT NE QUADRANGLE
SHEET NUMBER 99
7.5 MINUTE SERIES

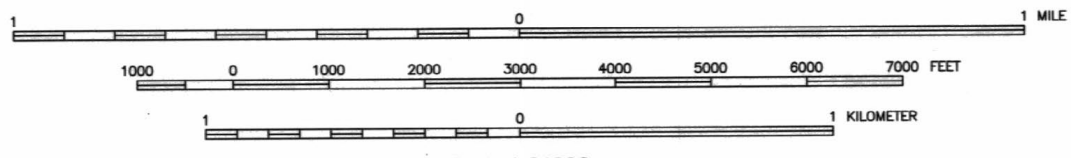
SHEET NUMBER 99 OF 106
CHOUTEAU COUNTY AREA, MONTANA
BELT NE QUADRANGLE

(Joins sheet 91, Big Sag)



(Joins sheet 99, Belt NE)

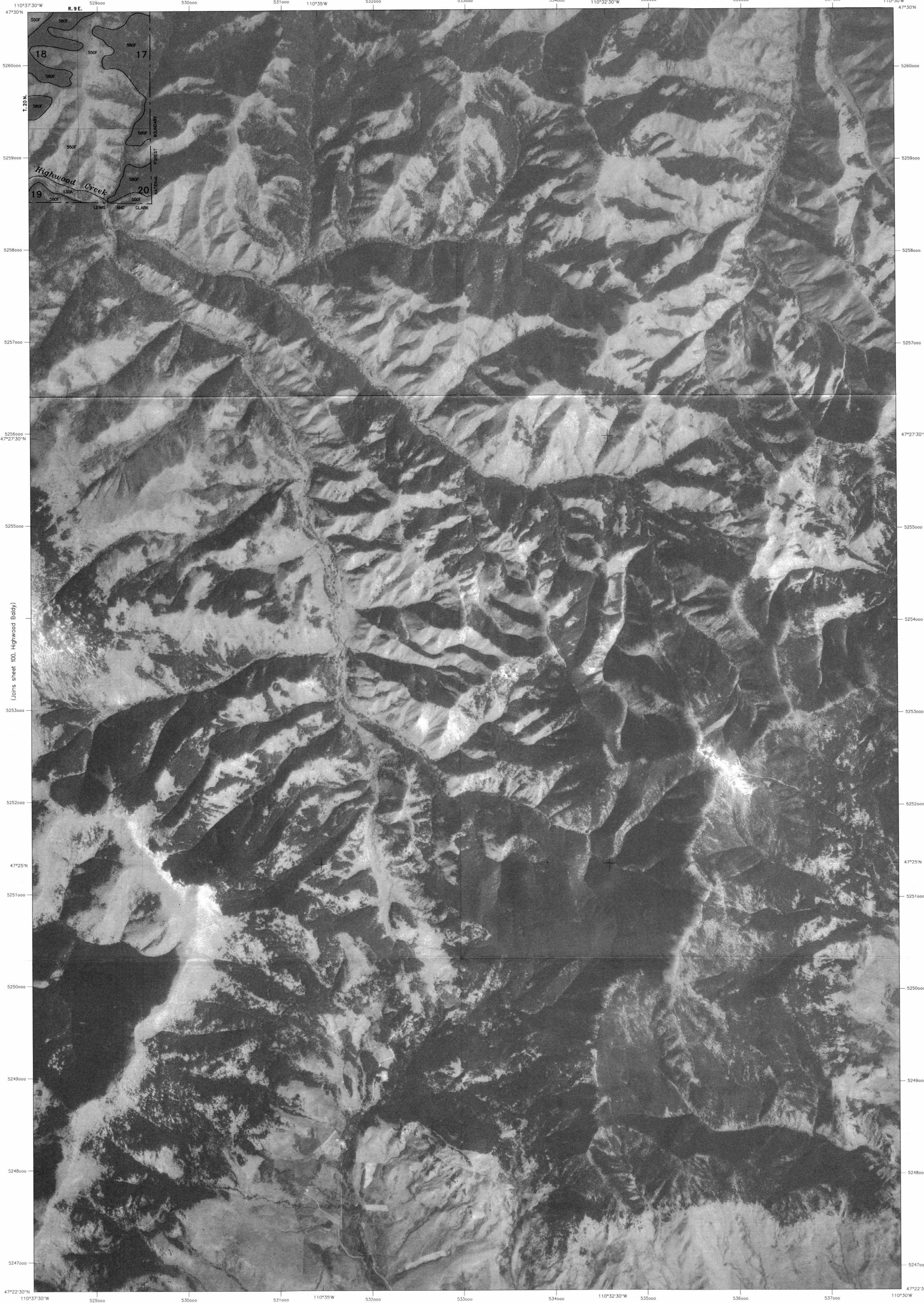
(Joins sheet 101, Arrow Peak)



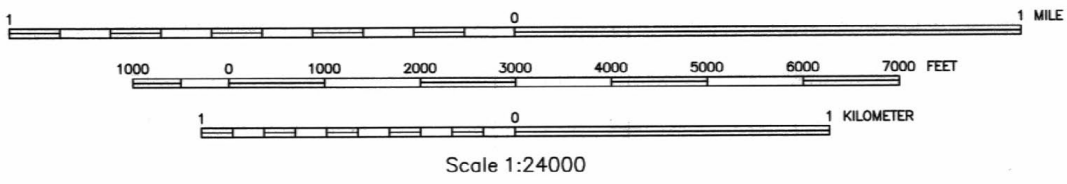
This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

(Joins sheet 92, Carter Mountain)



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Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum

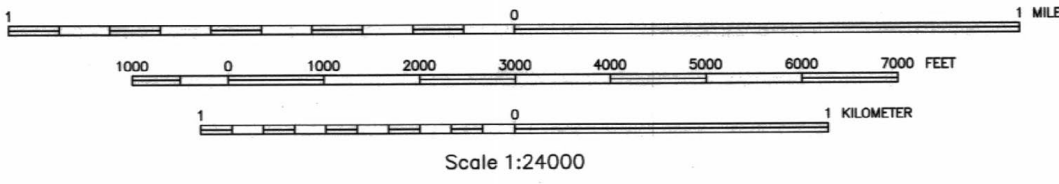


SHEET NUMBER 101 OF 106
CHOUTEAU COUNTY AREA, MONTANA
ARROW PEAK QUADRANGLE

(Joins sheet 93, Lepleys Creek)



This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971-1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.



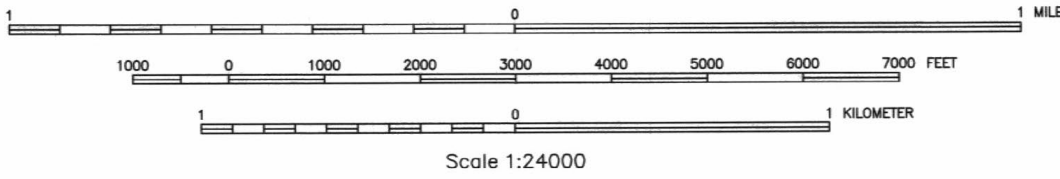
Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum



(Joins sheet 94, Geraldine)



This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971–1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.



Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum



SHEET NUMBER 103 OF 106
CHOUTEAU COUNTY AREA, MONTANA
JIGGS FLAT QUADRANGLE

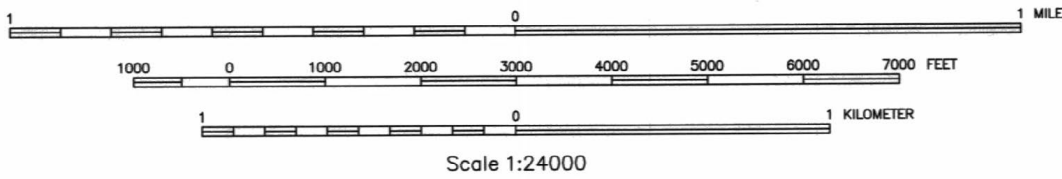
(Joins sheet 95, Square Butte)



(Joins sheet 103, Jiggs Flat)

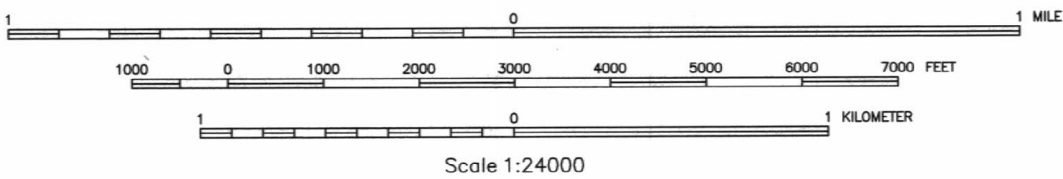
(Joins sheet 105, Strouf Island)

This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from 1971–1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.



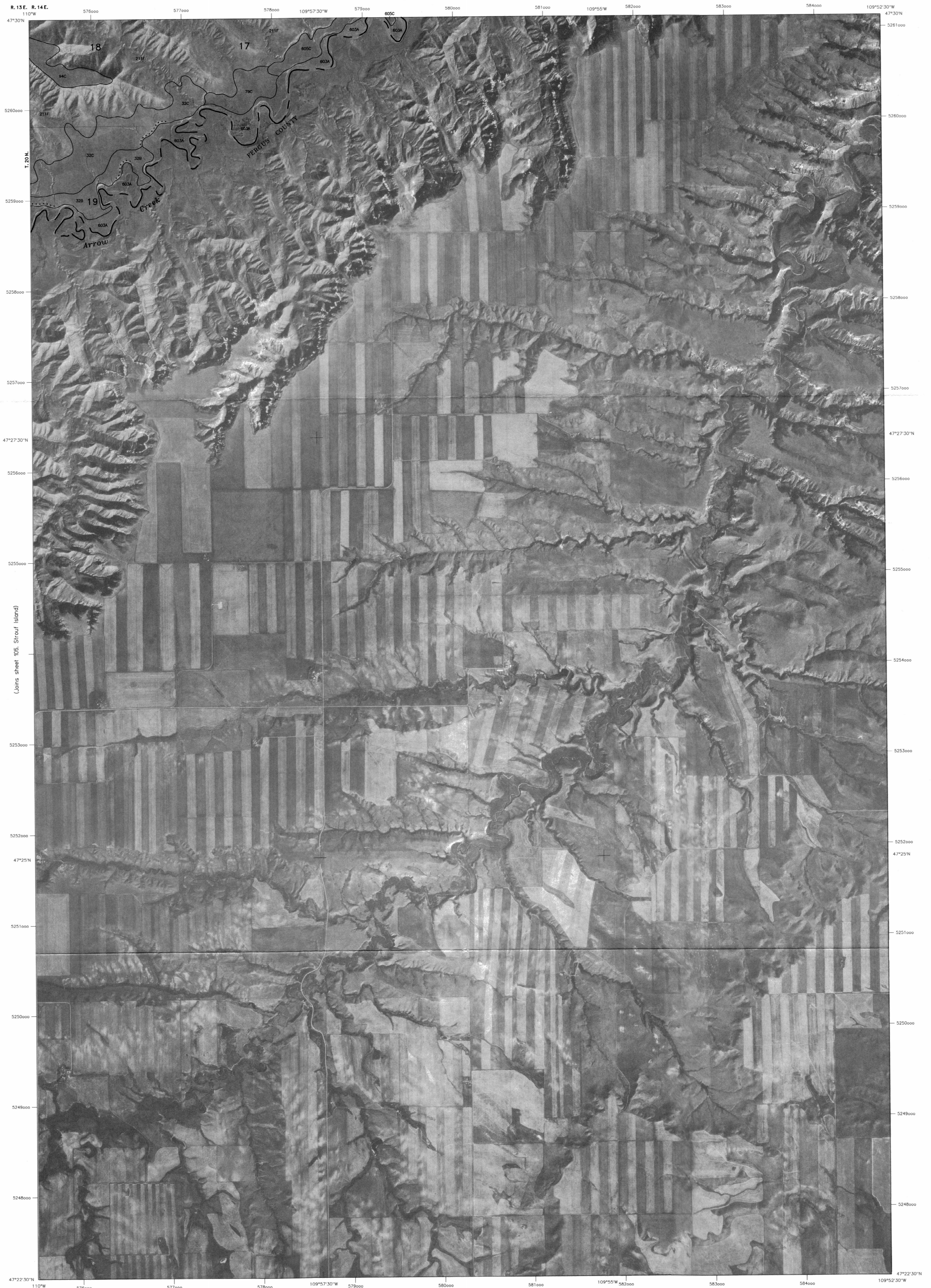
Digital Data: UTM Coordinate System Zone: 12
Polyconic Projection
1927 North American Datum





SHEET NUMBER 105 OF 106
CHOUTEAU COUNTY AREA, MONTANA
STROUF ISLAND QUADRANGLE

CHOUTEAU COUNTY AREA, MONTANA
POSSUM RUN CREEK QUADRANGLE
SHEET NUMBER 106
7.5 MINUTE SERIES



1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0 1 KILOMETER

Scale 1:24000

SHEET NUMBER 106 OF 106
CHOUTEAU COUNTY AREA, MONTANA
POSSUM RUN CREEK QUADRANGLE